Telephony

THE AMERICAN TELEPHONE JOURNAL

PUBLISHED EVERY SATURDAY.
TELEPHONY PUBLISHING COMPANY
VOL. 73 NO. 5.

CHICAGO, AUGUST 4, 1917.

SINGLE COPIES, 10 CENTS.
YEARLY, U. S. A., $3; CANADA, $4
ALL OTHER COUNTRIES, $5

H. G. WEBSTER
CONSULTING ENGINEER
MONADNOCK BLOCK
CHICAGO

Telephone Engineering.
Automobile Accessories.
Electric Signaling.
Patent Investigations.
Expert Testimony.

Engineering Library
AUG 4 1917
UNIV. OF MICH. LIBRARY

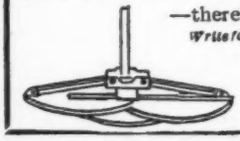
Engineering Library

RED SEAL
THE Battery
you know is not an experiment—
an old timer in the telephone field with lots of friends.
Ask Your Jobber.
GUARANTEE BACKED BY
MANHATTAN ELECTRICAL SUPPLY CO., Inc.
Chicago New York St Louis Frisco
FACTORIES: Jersey City Ravenna, O., St. Louis

American Steel & Wire Co.'s
W. & M.
TELEPHONE WIRE
AMERICAN STEEL & WIRE CO.
Chicago New York Cleveland
Worcester Pittsburgh Denver

You will
go around in a circle if you are looking for a better anchor than the

EVERSTICK
—there's a reason.
Write for literature



EVERSTICK Anchor Co.
St. Louis, Mo.

CEDAR POLES
Wire or write for delivered prices
NATIONAL POLE CO.
ESCANABA :: :: MICH.

PREPAREDNESS
IS IN
USING B & K CABLE
SUPPORTS WHICH HAVE BEEN
ADOPTED AS A STANDARD
BY THE LARGEST T & T CO.
Samples Upon Request
Write for Telephone Catalog.
B & K MFG. CO.
Railroad St.
New Britain, Conn.

Your men will prefer KESTER "ROSIN-CORE" SOLDER because it's all ready to use— Put yourself in their place. Do you blame your men who are working under all sorts of conditions, when they want the simple flux-solder.

Just a little touch of *Kester* at the place to be soldered, and the job is instantly and permanently done.

Order today from your jobber.

CHICAGO SOLDER CO.
CHICAGO, ILL.

KESTER ROSIN CORE SOLDER

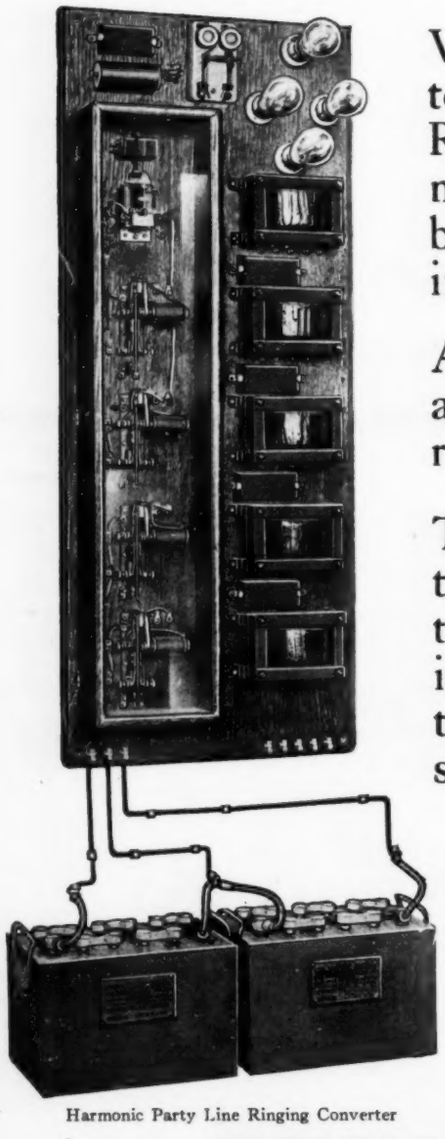
FORT WAYNE PRINTING COMPANY
FORT WAYNE, IND.
Printers and Blank Book Manufacturers
Write for Samples and Prices on I. C. C Forms
Ours Are the Best

Telephone Cables
ALL SIZES AND CAPACITIES
Hard Drawn Copper Telephone Wire.
Galvanized Iron Telephone Wire.
Siemens-Martin and High Strength Strands.
AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.
CHICAGO—112 W. Adams St,
CINCINNATI—Traction Bldg.
NEW YORK—165 Broadway

THE
THIMPULEYE
SAVES TIME
The Size is on the Eyes of
MATTHEWS SCRULIX ANCHORS
No chance of using wrong size without immediate detection.
W. N. MATTHEWS & BRO., Inc.
St. Louis, Mo.

The Largest and Most Complete Line of Ringing Equipment

Ringing machines for all systems of Harmonic and straight line ringing to operate off Electric Light Circuits or Batteries, providing the most economical as well as practical source of ringing power.



Harmonic Party Line Ringing Converter

We wish to call particular attention to our 12 Party Selective Harmonic Ringing system operated by our Harmonic Converter here shown, requiring but three vibrators for selectively calling one party out of 12 on a rural line.

A fourth vibrator provides the 16 cycle alternating current for straight line ringing.

This Converter is provided with a rectifier for charging its own storage battery from an alternating current lighting circuit and does not require a continuous power circuit for a constant source of ringing power.

If you are interested in selective ringing for your rural lines, write us at once. Our system is the best adapted for your needs.

Harmonic Ringers for all Frequencies.

LEICH ELECTRIC CO.

Factory and Main Office, GENOA, ILL. **Western Branch, KANSAS CITY, MO.**

DISTRIBUTORS

ELECTRIC APPLIANCE COMPANY
Chicago San Francisco Dallas New Orleans

ST. PAUL ELECTRIC COMPANY
316 Robert St., St. Paul, Minn.

Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves

PUBLISHED WEEKLY BY THE TELEPHONY PUBLISHING COMPANY
MONADNOCK BLOCK, CHICAGO
EASTERN OFFICE: 52 VANDERBILT AVE., NEW YORK CITY

J. C. KELSEY, PRESIDENT AND EDITOR.
S. R. EDWARDS, MANAGING EDITOR.
H. D. FARGO, SECRETARY AND TREASURER.
J. R. HASTIE, VICE-PRESIDENT AND ADVERTISING MANAGER.

Entered as second-class matter September 4, 1908, at the post office at Chicago, Ill., under act of March 3, 1897

Volume 73
Number 5

CHICAGO, SATURDAY, AUGUST 4, 1917

Subscription—10 Cents a Copy
$3 a Year U. S., Cuba and Mexico
$4 Canada, $5 Other Countries

By the Way—

How the Bell Telephone skeletons do rattle whenever somebody jerks open a closet door!

The Attorney General of Michigan filed a brief before the state commission the other day opposing metered service by the Michigan Bell company.

Among the points he raised was the 4½ per cent. the American Telephone & Telegraph charges its subsidiary which, he says, "works against the Michigan State Telephone Co."

People are growing weary of paying taxes to support kaisers, czars, and kings in luxury. Maybe Bell licensees will wake up some day and rebel against the American Telephone & Telegraph emperial court's 4½ per cent. levy.

The Telephone Operator.

The meanest man has been found! The man who gave his son a quarter to go without supper and charged him 50 cents for his breakfast because he was so hungry, had better look to his laurels.

A man in London complained bitterly to his favorite paper that he has never been able to get a prompt reply from his telephone exchange during an air raid, and suggested that the "heroines" (?) were all prostrate with terror or excitement. It is not stated whether this man has his telephone placed in a bomb-proof cellar, and was calling up the exchange because he was lonesome and wanted to hear a human voice, but such a case can be suspected.

Those who live in cyclone areas in this country know something of air raids, and it is considered fashionable as well as sensible to retire to a storm cellar for thirty minutes before any one thinks of looking out. No one thought of calling a telephone operator at this time because she was presumed to have the same sporting chance.

There is nothing in the charter of a telephone company which compels an operator to die at her post unless she wants to. The truth of the matter is that telephone operators do die at their posts. The records teem with deeds of heroism of delicate girls every time opportunity offers. We have never yet heard of a group of telephone girls in a crisis resorting to the usual manly art of knocking each other down in order to reach a fire escape first.

The telephone operator needs no defense. She has a proud record of heroism and nothing can shake our faith in her ability to do the right thing, the courageous thing, at the right time.

She does not claim to be a heroine, but whether it be fire, cyclone, flood, or air raid, you will find her doing the heroic thing as naturally and calmly as if it were an every-day occurrence. But try to remember that during such a crisis, she has public business to look after.

Because she does not answer our foolish call instead, it is no sign that she is prostrate with terror and excitement as we are, but calmly doing the greatest good to the greatest number.

Woman and the Telephone.

The women of England are doing men's work and doing it well. However, they do not escape criticism from crusty men. The Telegraph and Telephone Journal, of England, calls attention to a complaint made by an angry correspondent, that women are to blame for the busy telephone.

"However excellent her business capacities are, she is unable to resist the lure of the telephone. If no business calls come through, she will ring up her friends and indulge in chats about Lizzie's baby, Amy's hat, etc. Meanwhile frenzied subscribers are being flouted with the parrot cry, 'Number engaged!'"

Since Eve's time, it has been the habit of men to blame all her descendants for every evil. In America it is realized that women are to be thanked for the wonderful growth of the telephone business, for it was their quick perception of its value and utility that makes our residence subscriber list so much greater than the business list.

We are glad that someone is remembering Lizzie's baby and Amy's hat. It is certain proof of a double track mind, so useful in times of distress and trouble.

Next time we find a line busy, we will think of Lizzie's baby and Amy's hat, and cheerfully call again.

Progressive Ohio Telephone System

Some Interesting History Relative to the Growth and Progress of the Bellevue Home Telephone Co. and the Local Telephone Co. of Bellevue, the Crestline and Wood County Companies, Which Are Affiliated with the Bellevue Home

By L. M. Peterson

The Bellevue Home Telephone Co. which recently cut into service new common battery central office equipment, is a progressive Independent company operating 1,800 telephones in Bellevue, Ohio, an enterprising city of some 5,200 population.

The company was organized in 1897, with the following officers: President, C. R. Callaghan; vice-president, Frank A. Knapp; secretary, D. J. Beck; and general manager, D. Calhoun. The board of directors consisted of Messrs. Callaghan, Knapp, H. C. Stahl, B. F. Bell, and W. M. Halliday.

The first exchange was located on the second floor of the Molland block and operations were commenced in June, 1897, with about 75 subscribers. The business of the company grew constantly and kept pace with the growth and development of the city.

The old quarters in the Molland block became outgrown and in August, 1909, the exchange was moved to the second floor of the Gazette block and new equipment of the American automatic type installed, the number of subscribers having increased to about 1,000.

At the same time, the entire outside plant was rebuilt, the wires in the business section of the city being placed underground and a considerable amount of open wires replaced by cables.

The company's subscribers' list continued to increase and it soon became necessary to provide additional facilities to meet the growing demand for service. As a result an order was placed for the new common battery equipment which has just recently been cut into service.

The Bellevue Home company now has 64 miles of pole line, one-half mile of underground plant, over five miles of cable, containing more than 1,000 miles of wire, and in additon some 450 miles of open wire.

Frank A. Knapp is now president and general manager of the company. C. W. Bell is vice-president and Ralph T. Wolfrom, secretary and treasurer.

Frank A. Knapp.

Mr. Knapp has been with the company since its inception. During the first year of the company's operations, he acted as vice-president and from 1898 to 1906, he served in the capacity of secretary. For five years Mr. Knapp was postmaster of Bellevue, but the year following his election to the presidency and general managership of the telephone company, he resigned to devote his entire time to his telephone interests.

The Local Telephone Co. of Bellevue one of the pioneer Independent companies in that territory, was organized by Mr. Knapp and his associates to consolidate various smaller companies operating throughout the territory and to improve conditions in the field, the organizers realizing that a telephone system well developed and properly managed would be appreciated by the public, and be profitable as well.

The company was organized in April, 1902, with less than a thousand telephones and some few miles of toll line. Its growth up to the present time is shown in the following table:

Number of telephones in 1906, 3,600.
Number of telephones in 1910, 5,200.
Number of telephones in 1914, 5,800.
Number of telephones in 1917, 6,700.

Exchanges are located at Norwalk, Chicago, Monroeville, Attica, Plymouth, New Washington, New London, Greenwich, Milan, Berlin Heights, Wakeman and Havana. An extensive system of toll lines is owned and operated throughout the territory, comprising 250 miles of toll circuits.

Considerable attention has been paid to putting the property of the company into first-class condition. At Norwalk, the largest exchange, the company has let contracts for the rehabilitation of its central office equipment and when completed it will retain all the new automatic features recently incorporated in manual common battery equipment.

A large amount of cable has also been purchased, to not only replace open wires,

Glimpses of the Local and Long-Distance Operating Rooms of the Bellevue Home Telep hone Co.

The Wire Chief's Desk.

but also to increase outside capacity. When this has been installed, practically all exchanges will be cable plants with a minimum of open work.

The Chicago exchange, its second largest, also operates common battery equipment, the other ten excharges being magneto.

The executive offices of the Local Telephone Co. are in common with the headquarters of the Bellevue Home Telephone Co. in the Gazette block in Bellevue.

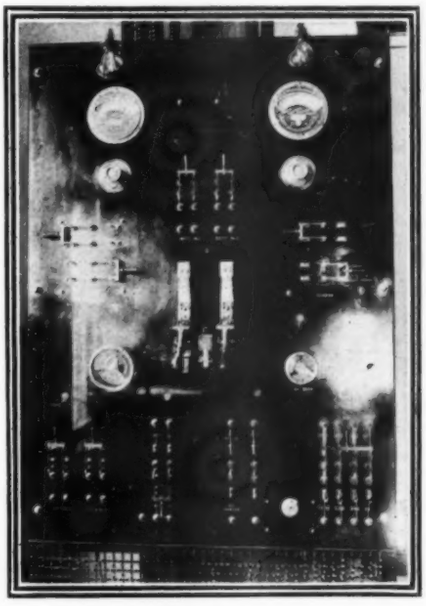
Mr. Knapp served the Local Telephone Co. in the capacity of secretary from its inception until the year 1905, when he was elected to his present office of president and general manager.

The Crestline Telephone Co. was also organized by Mr. Knapp and his associates in 1902, which company he served in the capacity of secretary until 1907, when he was elected vice-president and general manager. The Crestline company operates a common battery exchange at Crestline, Ohio, with 1,100 telephones.

In June, 1914, Mr. Knapp was prevailed upon to take over the management of the Wood County Telephone Co., operating exchanges at Bowling Green and North Baltimore, Ohio. The Wood County company had been hard hit by sleet storms and floods, and had suspended payment of dividends. At the end of 1915, under Mr. Knapp's management, dividends were resumed and have been paid regularly ever since. Mr. Knapp is now serving this company as vice-president and general manager, and the company operates 1,750 telephones.

Both the Crestline and Wood County telephone companies have executive offices in common with those of the Local and Bellevue companies, making a total of 11,150 telephones managed by the general office in Bellevue.

Mr. Knapp is also interested in the Flat Rock Telephone Co., of Flat Rock,



Power Panel of the Bellevue Home.

Ohio, of which he is vice-president, and the North Fairfield Telephone Co., of North Fairfield, Ohio, of which he is a director.

He is active in state and district asso-

Mrs. Rose Gerhardstein, Chief Operator.

ciation work and is a director of the Ohio Independent Telephone Association as well as vice-president of his local district.

Mr. Knapp is one of the strong pillars of Independent telephony in Ohio and is largely responsible for bringing the telephone service in his section of the state up to a high standard of efficiency, as well as putting the plants on a paying basis. He is director and chairman of the executive committee of the Ohio State Life Insurance Co. of Columbus, Ohio, director of the First National Bank, Bellevue, director of the Bellevue Chamber of Commerce, director of the Gazette Publishing Co., president and treasurer of the Conway Stove Co., Bellevue.

William H. Covell, local manager of the Bellevue Home company, entered the telephone business in 1890 as troubleman for the Bellevue company. He was later made wire chief and in 1910 was promoted to manager, which position he has held since that time.

Mr. Covell took care of the company's interests on two cutovers, from magneto to automatic in 1909, and from the Amer-

General Manager Knapp Finds "Telephony" Indispensable in His Private Office—Local Manager Covell of the Bellevue Home.

ican automatic system to common battery in March of this year. He is a member of both state and national Independent telephone associations.

Prior to entering the telephone field.

Modern and Well-Arranged Office of the Secretary-Treasurer Speaks Efficiency.

Mr. Covell was superintendent of the Bellevue Power Co. He is a Spanish war veteran.

The affairs of both the Bellevue Home Telephone Co. and the Local Telephone Co. have been wisely managed; the companies have never missed the payment of dividends, and ample funds have been set aside for depreciation and improvements.

Hazardous Task of Linemen on French Battle Fields.

In a special dispatch from a Paris correspondent of The Daily News, the story is told by a French soldier of the hazardous task of the telephone lineman on field duty. "Few roles are more ungrateful or call for more patience than that of the telephone operator in the field," the soldier states. "And though it entails much difficulty and fatigue, for in it there is much to do and not much time for sleep, there is little glory connected with it.

"At any time of the day or night two telephonists, one with his bag of tools, the other with his spools of wire, must be prepared to follow the line that has been struck by a shell. For hours through the mud they must seek for the rupture, pausing in the most dangerous parts of the field.

Like the dispatch bearers, the telephonist's work is dangerous and he is often struck down at his task. At Avocourt three telephonists were wounded in three days, one of them, I believe, dying of his wounds. When this occurs an appeal is made for volunteers among the men who, while on repose in the rear, have taken lessons in telephony.

It is easy to procure telephonists, for men are attracted by the advantage of being exempt from fatigue duty while in repose and trench digging while at the front, both appreciable advantages that are envied by all. From time to time a division will organize a class of telephonists in the rear for the soldiers in repose.

The classes last three days, morning and afternoon. They are naturally more practical than theoretical. In a few words one is taught that when an instrument is out of working order, if not the fault of the battery or the contact, it is useless either to take it apart or abandon it—it must be sent immediately to the repairing center. The pupils then pass on to the practical exercises.

Lines are laid in gardens, in streets of villages; one learns the importance of cartridge shells, or, better still, of unfired cartridges. Such ammunition is plentiful to replace regular wire holders, of which the operator may perhaps receive 50 a month and which he is tempted to preserve as rare souvenirs in his sack. There are all sorts of practical and necessary details to study. One learns that it is no longer permissible to lay the line in the ground within 500 yards of the first lines, or in general of any important lines, for there are modern instruments which render it possible to intercept conversation of a sector when ground return is used.

Finally the operator starts out convinced that he can overcome any difficulty with a machine that does not work. He now knows all the causes of his former lack of success. He reaches the trenches, he installs his line. All goes well, everything is perfect. He is preparing to congratulate himself when, at a call, taking his receiver down in his sap, he hears a thunderous voice in reply to his 'Hello!' which cries: 'Get off the line, will you? What do you mean? I want the general of the division! Hello! Is the general there?' One remains silent, listening to the report, which is evidently from the commandant of a sector to the general of the division—an account of shells fallen or men wounded and killed, of the work under way—when suddenly the voice of the lieutenant is heard: 'Well, anything new? We are firing the first piece at an angle of 45 degrees.'

He has not time to continue before the captain, the general and he are all speaking at once, asking who is there, interrupting each other—all furious. Epilogue: A violent altercation in the trench, between the telephonists and the infantry, each one blaming the other!"

Bellevue Home and Affiliated Companies Occupy Second Floor of This Building.

Consolidation of Competing Plants

Power of Nebraska State Railway Commission to Approve of Consolidation of Competing Plants Upheld in Opinion of Commissioner Wilson in David City-Butler County Case — Excerpt from Opinion — Toll Collections Discussed

The power of the Nebraska State Railway Commission to approve of consolidation of competing plants is upheld in the opinion of Commissioner Wilson in the David City-Butler county case, and the declaration made that if it does not have this power, it has none at all. He held, however, that consolidation of any existing telephone properties is subject to the approval of the commission within the reasonable exercise of its powers. He said:

"The constitutional provision which created the commission made it the duty of the commission to regulate the service and exercise general control of common carriers. Service and general control are very broad terms. Definition is unnecessary to show their application to the consolidation of existing telephone service, such an act involving not only a unification of service but also the elimination of competition and the establishment of new rates for the changed service. Consolidation goes to the very heart of the principal factors of state control of public service, and if the commission has no authority in the matter, it is without any power whatsoever."

The commercial interests of David City and a number of individuals had objected to a consolidation and challenged the power of the commission to approve of this one or to permit the sale and purchase by the Lincoln Telephone & Telegraph Co. of exchanges from existing local companies. The commission holds that there is little doubt that no substantial part of a property used in supplying a public service can be disposed of or purchased without the approval of the state through some of its agencies. The property cannot be installed without the consent of the state, inasmuch as the power of eminent domain or equivalent powers are required. Mr. Wilson says:

"Therefore it follows necessarily that it cannot be removed without a like consent. Moreover, property devoted to a public use is charged with a trust character in favor of the public. The trust has its foundation in the laws permitting private individuals and companies to conduct a natural monopoly and, additional in the case of telephone companies, to build their pole lines upon the public highways. The rights and privileges thus granted contain the reciprocal obligation of the grantee to continue to furnish the service after installing the plant, and the grantee may not do anything which will in any substantial measure disable it in discharging the obligation without the consent of the state.

A fundamental part of the law of trusts is that the parties cannot be changed without common consent, and this is vital in the case of public service properties. It may be that the purchaser is lacking in means or administrative ability to continue the service, and the result of the transaction is foreseen in reason to be a great deterioration of the service and possibly complete abandonment."

Mr. Wilson says that in the instant case the commission lacks power to annul the purchases by reason of defect of parties. It may impose such conditions to the approval of the purchases, to the consolidation of the properties purchased with applicant's original plant, and to the fixing of new rates as may be reasonably necessary to carry out the intent and purpose of the trusts imposed upon the companies from whom purchases were made, in this case the Surprise and Octavia companies. He therefore proceeds to carry out these trusts by a plan of interchange service that brings practically all of Butler county within its benefits.

The Surprise company was the principal one in the field of county service, having exchanges at seven of the eleven urban centers in the county, including the county seat, David City, and interchanged service with the Ulysses company, covering the western two-thirds of the county. When it sold half its property to the Lincoln company, it cut off communications long existing, unless the commission steps in to preserve them, and that is what is sought in the order. Mr. Wilson interjects this observation upon the results of such actions:

"There is a condition in the telephone field and in every other public service field to which too little consideration is given by those who produce and sell the service, to-wit: The needs and wishes of the purchasers. This is doubtless due to the absence of competition, as even the whims and caprices of buyers in the competitive field are catered to.

Insofar as the service demanded of public utilities is practically capable of production, the public is entitled to it so long as it is willing to pay for it. And this willingness is attested by the highly prosperous condition of practically all common carriers that have been honestly and prudently managed. Owners and operators of such plants should bear in mind that they occupy the field through public suffrance and that the public itself can produce and supply such service as it desires without delegating the work to others."

Another feature of the opinion is the position taken with reference to toll collections. The company contended that the Butler county exchanges should not be credited with more than 25 per cent. of their toll collections, while 75 per cent. goes to the companies owning the connecting lines and exchanges substantially according to the distance the message is transmitted, following the allocation of the statute.

Mr. Wilson says that the records show that the expense of furnishing long-distance service over the applicant's lines in the county is charged to the exchanges, and therefore the revenues earned by those lines must be credited to them. He says that if such a division were made, it is a fair surmise, in view of the extent of toll property in the county, that the exchanges would receive more than their gross collections of toll revenues.

As the burden was on the company to show that these collections do not belong to the exchanges and having failed to do so, credit is given to the exchanges in the estimate based on collections for all such revenues, at the same time including the toll line property with the exchange properties in the fixing of local rates. The commission's order thereon was:

"It is further ordered, pending the establishment of permanent rates therein, that applicant shall credit its Butler county zone with its proportion of all charges for long distance messages originating or destinating at its exchanges in the county or passing over its lines in the county and to Columbus (where connection is made with Bell long distance lines) in the manner provided by statute for the division of such charges between separate companies, applicant's exchanges and lines being treated as if they were the property of a separate company, that is to say, the Butler county zone shall be credited with 15 per cent. of the charges for messages originating therein, 10 per cent. of the messages destinating therein, and such proportion of the mileage share of such charges as the distance each message uses the toll lines in the county and to Columbus bears to the otal distance the message is transmitted."

It is also ordered that all revenues above $8,572.90 a year, after making usual allowances, shall be held in trust for final disposition when permanent rates are made, thus limiting interest return.

Fundamental Principles of the Telephone Business

A Reading Course Designed to Present Logically the Principles Which Underlie Successful Organization and Operation of Telephone Properties—Prepared Under the General Supervision of Stanley R. Edwards—This Section, "Part VI, The Valuation of Telephone Properties," Written by Chas. W. McKay

Quiz Questions on the Preceding Installment.

232. How may the cost of splicing cable terminals be determined with sufficient accuracy for all practical purposes?

233. What do the costs of exchange aerial wire and toll aerial wire include?

234. Into what two general classes are aerial wire unit costs divided? Discuss the subdivisions of these classes.

235. In Table XXI what is included as part of the line wire unit cost? What items enter into the unit costs of city copper-clad line wire, Table XXII? How is the unit cost for Lock aerial conduit, Table XXIII, derived?

236. Explain the unit costs given in Table XXIV.

237. Discuss the unit costs for toll and rural line wire.

238. Upon what are the cost analyses which have been presented, predicated?

Chapter XV.—Outside Wire and Conduit Costs (Concluded).

239. *Underground Conduit Construction.*—The Interstate Commerce Commission's accounting system prescribes that "the cost of service conduits, including cost of pipe, cement, manholes, and all other materials used, the cost of connecting to poles and buildings, repaving, and other costs incident to the installation of such conduits," shall be charged to the underground conduit accounts. The exchange construction is chargeable to account 244 and toll construction to account 254.

Underground conduit unit costs are among the most important involved in the appraisement of a telephone property. The truth of this statement will be appreciated when it is realized that the cost of main conduit construction may run as high as $4 or $5 per lineal foot of conduit, exclusive of repaving costs.

Manholes cost all the way from $25 or $30, for a small hand box on an unpaved street, to $4,000 or $5,000 for a large manhole in the center of a large city. In one of our largest cities the Bell company has a manhole located at the intersection of two of the busiest streets, which, it is claimed, cost in the neighborhood of $5,000.

It is hardly necessary to state that the high cost of this particular manhole was not due to its size, or to the material used in its construction. The incidental expenditures involved in the avoidance of the pipes and conduits of other companies, located in this congested district, and in carrying on the construction work without interrupting the city traffic, were responsible for the enormous cost of this particular manhole.

240. *Divisions of Conduit Unit Costs.*—Underground conduit unit costs may be divided into three general subdivisions:

1. Main conduit—conduit between manholes.
2. Lateral conduit—branch conduit to poles or buildings.
3. Manholes.

241. *Main Conduit Unit Costs.*—In Table XXXI is presented a rather complete analysis of the cost of placing various types and sizes of main (tile) conduit. All these costs are exclusive of the costs of manholes and of replacing the pavement over the subway. They are based upon a complete concrete envelope.

242. *Unit Costs of Lateral Conduits.*—The unit costs for lateral conduits are built up in the same manner as those for main conduit, but as a rule they run a little higher. Lateral conduits do not usually exceed three ducts in size.

In addition to the cost of the lateral conduit between the manhole and the pole, there is also the cost of providing terminal facilities at the pole. Lateral conduits usually terminate in what are known in telephone parlance as "risers." The cost of risers of various types is shown in Table XXXII.

Length of Riser in Feet.	3-Inch Pipe Bends.	Vertical Pipe.	Labor.	Total Cost.
..	$3.15	.....	$0.50	$ 3.65
5	3.15	$1.10	1.00	5.25
10	3.15	2.20	1.50	6.85
15	3.15	3.30	1.75	8.20
20	3.15	4.40	2.00	9.55
25	3.15	5.50	2.25	10.90
3-inch iron pipe	.....	$0.22 per ft.		
3-inch bends	.....	3.15 each		

Table XXXII. Cost of Lateral Risers.

243. *Manholes and Their Costs.*—There are two general types of manholes used in telephone work—brick manholes and concrete manholes.

In a recent valuation of the property of the Chicago Telephone Co., a unique system of estimating manhole costs was evolved.

This method consists of estimating a base charge which includes the cost of manhole covers and other similar costs common to manholes of various sizes. To this base charge is added an allowance for the cost of the manhole itself, based upon its cubic contents.

In a recent telephone appraisal where this method of estimating manhole costs was employed, a base charge of $20 was used, and to this base charge was added an allowance of 25 cents per cubic foot excavated. In other words, the contents of the manhole excavation was computed and appraised at 25 cents per cubic foot, and to the result thus obtained an additional charge of $20 was added to cover the cost of placing the casting, etc.

This method may be modified into a more convenient form by applying a unit cost per cubic foot, based on the interior dimensions of the manhole. These dimensions would consist of the average length at the inside of the manhole, the

No. Ducts. Col. 1.	Cu. Yds. Excavation per Tr. Ft. Col. 2.	Cu. Yds. Concrete and Mortar per Tr. Ft. Col. 3.	Cost Tile and Miscellaneous Material per Tr. Ft. Col. 4.	Cost Excavating and Backfilling and Hauling Excess Dirt. Col. 5.	Cost Concrete in Place. Col. 6.	Labor Laying and Distributing Tile. Col. 7.	Hauling Tile and Concrete Material. Col. 8.	Total per Tr. Ft. Col. 9.	Total per Duct Ft. Col. 10.
2	0.16	0.04	$0.08	$0.16	$0.24	$0.02	$0.02	$0.52	$0.26
4	.20	.05	.16	.20	.30	.04	.04	.74	.185
6	.21	.06	.24	.21	.36	.06	.06	.93	.155
10	.26	.07	.40	.26	.42	.10	.10	1.28	.128
16	.32	.08	.64	.32	.48	.16	.16	1.76	.11
20	.32	.08	.80	.32	.48	.20	.20	2.00	.10
28	.40	.09	1.12	.40	.54	.28	.28	2.62	.094
40	.51	.10	1.60	.51	.60	.40	.40	3.51	.088

Col. 4: Tile and miscellaneous material, 4 cents per duct foot.
Col. 5: Excavating, backfilling and hauling excess dirt at $1 per cu. yd. of excavation.
Col. 6: Concrete and mortar in place, $6 per cu. yd.
Col. 7: Labor distributing and laying tile at 1 cent per duct foot.
Col. 8: Hauling tile and concrete material at 1 cent per duct foot.

Table XXXI. Analysis of Subway Costs, Exclusive of Manholes and Repaving.

Gage.	Pairs.	Splicing Material.	2 Per Cent. Loss and Waste.	Total Material.	Rodding.	Pulling In.	Splicing and Testing.	Teaming.	Total Labor With Supervision, 15 Per Cent.	Total Cost. Labor and Material.
No. 22...	25	$1.013	$0.020	$1.03	$2.65	$4.50	$ 4.75	$1.50	$15.41	$16.44
	50	1.233	.025	1.28	2.65	5.07	5.82	1.56	17.37	18.65
	75	1.453	.029	1.48	2.65	5.55	6.70	1.60	18.98	20.46
	100	1.622	.032	1.65	2.65	6.00	7.50	1.65	20.47	22.12
	150	1.747	.035	1.78	2.65	6.67	8.90	1.73	22.94	24.72
	200	1.981	.039	2.02	2.65	7.20	10.00	1.80	24.80	26.82
	400	2.274	.046	2.32	2.65	9.00	12.50	2.00	30.07	32.39
No. 19...	25	1.026	.021	1.05	2.65	5.15	5.46	1.64	17.14	18.19
	50	1.258	.025	1.28	2.65	5.70	6.69	1.70	19.25	20.53
	75	1.491	.029	1.52	2.65	6.22	7.71	1.74	21.07	22.59
	100	1.672	.033	1.71	2.65	6.62	8.63	1.79	22.64	24.35
	125	1.747	.035	1.78	2.65	7.05	9.48	1.83	24.16	25.94
	150	1.822	.036	1.86	2.65	7.40	10.24	1.87	25.48	27.34
	175	2.003	.040	2.04	2.65	7.72	10.90	1.90	26.65	28.69
	200	2.081	.042	2.12	2.65	8.05	11.00	1.93	27.17	29.29

Section lengths—325 feet.

Table XXXIII. Costs of Placing Underground Cable, 325-Foot Sections.

average width, and the distance from the bottom of the manhole to the street level.

It is obvious that if this cubic-contents method is employed in the appraisement of telephone manholes, it is most important that both the base charge and the cost per cubic foot be carefully checked in order to make sure that they meet the individual requirements of the case in hand. This may be readily accomplished by computing the actual cost of several typical manholes in the plant under appraisement and varying the base charge and the cost per cubic foot until they meet the requirements of the case.

244. *Repaving Costs.*—The cost of repaving over main conduit, lateral conduit and manholes is an appreciable item in the appraisal of telephone properties.

Paving costs are almost entirely dependent upon local conditions. It is, therefore, out of the question to attempt to give actual figures in a general discussion of this subject. Suffice it to say that the local charges for replacing pavement of various types should be carefully checked by the appraisal engineer. Subsequently the total amount of pavement displaced, of each type, should be carefully computed and appraised at whatever costs the appraisal engineer may deem fair for the locality under consideration.

CHAPTER XVI. Underground Cable Unit Costs.

245. *What Underground Cable Accounts Cover.*—Under the provisions of the Interstate Commerce Commission's uniform accounting system, the underground cable accounts should cover "the cost of service underground cables—including cable boxes and fittings, loading coils and other materials used in the work of installing such cables and all of the costs incidental thereto."

These accounts should also include, in addition to the main exchange underground cable, the subsidiary or lateral cables extending from manholes to poles or buildings; the interior block cables (cables within city blocks); building or house cables; and the cables used in terminating exchange and toll feeder cables within the central office.

246. *Major Subdivisions of Underground Cables.*—There are, then, five major subdivisions under which the subject of underground cable unit costs should be considered. They are:

1. Underground cable proper—exchang or toll cables in main conduit.
2. Subsidiary cable—branch cables from manholes to poles or buildings.
3. Interior block cables—cables along the rear walls or fences of city blocks.
4. House cables—distribution cables within buildings.
5. Central office terminating cables—silk and cotton or wool insulated cables used to terminate the exchange and toll underground cable on the main frame at the central office.

247. *The Underground Cable Proper.*—Taking up these five subdivisions in the order of their importance from the cost standpoint, we have first, the underground cable proper.

Splice.	Add for Each Additional Leg.*	Add for Each 25 prs.	Total Additional Cost.
400-200-200....	$1.75	$....	$1.75
400-400-200....	1.75	7.20	8.95
200-200-25.....	1.25	.90	2.15
200-200-25.....	1.25	.90	2.15
200-175-25-25..	2.50	.90	3.40
175-50-50-25...	2.50	....	2.50
400-200-200....	1.75	....	1.75
400-400-100....	1.25	3.60	4.85
400-200-200....	1.75	....	1.75
200-200-50-50..	2.50	3.60	6.10
200-200-50.....	1.25	1.80	3.05
200-150-25.....	1.25	....	1.25
400-400-100-50.	2.50	5.40	7.90
150-125-25.....	1.25	....	1.25
400-400-50.....	1.25	1.80	3.05
400-400-25.....	1.25	.90	2.15
400-200-25.....	1.25	.90	2.15
400-200-200....	1.75	....	1.75
200-200-25.....	1.25	.90	2.15
400-200-200....	1.75	....	1.75
400-400-150....	1.50	5.40	6.90
400-400-75.....	1.25	2.70	3.95
400-200-50.....	1.25	....	1.25
125-50-50-25...	2.50	....	2.50
50-25-25.....	1.25	....	1.25
200-200-25.....	1.25	.90	2.15
400-400-200....	1.75	7.20	8.95
200-150-25.....	1.25	....	1.25
400-200-200....	1.75	....	1.75
400-200-25.....	1.25	....	1.25
400-400-25.....	1.25	.90	2.15
400-400-200....	1.75	7.20	8.95
150-125-25.....	1.25	....	1.25
150-150-50.....	1.25	1.80	3.05
125-100-25.....	1.25	....	1.25
150-100-50.....	1.25	....	1.25
100-100-25.....	1.25	.90	2.15
100-100-25.....	1.25	.90	2.15

*Up to 150-pair $1.25
150-pair 1.50
200-pair 1.75

Table XXXV. Additional Costs for Special Splices.

The same general plan should be followed in building up the unit costs essential to the appraisement of the underground cable system as has been outlined in Chapter XIV on aerial cable costs. In other words, a careful analysis of material and labor costs for a period of several years preceding the appraisal should first be made and this analysis used as a basis for determining fair reproduction costs as of the appraisal date.

Table XXXIII presents an analysis of the labor and splicing material costs incidental to the placing of various sizes of Nos. 19 and 22 gauge underground cable. It will be noted that the various items of labor costs, such as rodding, pulling-in, splicing, testing and teaming, are estimated separately. These, together with the allowance for field supervision and the cost of the splicing material, make

Gage.	Size.	Cable Cost, Foot.	Cable Cost, Per 1,000 Ft.	Misc. Material Section.	Misc. Material Per 1,000 Ft.	Labor Per Section.	Labor Per 1,000 Ft.	Total Cost, Per 1,000 Ft.	Total Cost Per Foot.
No. 22..	25	$0.088	$ 88.00	$1.03	$3.17	$15.41	$47.50	$138.67	$0.139
	50	.135	135.00	1.28	3.94	17.37	53.40	192.34	.192
	75	.175	175.00	1.48	4.56	18.98	58.40	237.96	.238
	100	.217	217.00	1.65	5.09	20.47	63.05	285.14	.285
	150	.293	293.00	1.78	5.49	22.94	70.66	369.15	.369
	175	.330	330.00	....	....	....	....	....	....
	200	.416	416.00	2.02	6.23	24.80	76.38	498.61	.499
	400	.700	700.00	2.32	7.15	30.07	92.62	799.77	.800
No. 19..	25	.113	113.00	1.05	3.23	17.14	52.79	169.02	.169
	50	.199	199.00	1.28	3.94	19.25	59.29	262.23	.262
	75	.271	271.00	1.52	4.68	21.07	64.90	340.58	.341
	100	.369	369.00	1.71	5.27	22.64	69.73	444.00	.444
	125	.444	444.00	1.78	5.49	24.16	74.41	523.90	.524
	150	.505	505.00	1.86	5.73	25.48	78.48	589.21	.589
	175	.571	571.00	2.04	6.28	26.65	82.08	659.36	.659
	200	.636	636.00	2.12	6.53	27.17	83.68	726.21	.726
No. 22..	25D.W.	.102	102.00	1.03	3.17	15.41	47.50	152.67	.153

Section lengths = 325 feet. One splice for each section.

Table XXXIV. Unit Costs of Underground Cable Installed.

up the total cost of placing the cable.

In Table XXXIV the costs derived in Table XXXIII have been added to the cost of the cable itself to build up a total cost per foot as shown in the last column of table.

It will be noted that both tables are based upon a 325-foot section of length. In other words, in the appraisal from which the unit costs shown in Tables XXXIII and XXXIV were taken, it was found that the average distance between manholes was 325 feet. In Table XXXIV, for purposes of convenience, the various items of cost have also been expressed in terms of cost per thousand feet—practically three section lengths—and finally reduced to a cost per foot.

In these illustrations, it has been assumed that there will be one splice to each section for every size cable. In some cases these splices will merely consist of a straight splice between two cables of the same size and gauge, and without branches. In other cases the size of the main cable may diminish and one or more branch or lateral cables may be taken off.

The units as given in Tables XXXIII and XXXIV cover only the cost of straight splicing. The additional cost of branch or special splices over the cost of straight splices are computed, as shown in Table XXXV.

It should be clearly borne in mind that the prices given in these tables are merely for illustrative purposes—to show the general method which should be used in building up the unit costs. Material and labor prices fluctuate so rapidly and are so dependent upon the exigencies of individual cases that it is impossible to publish unit costs which will be suitable for practical appraisal purposes. Every case should be carefully considered by itself and all of the variable factors thoroughly analyzed before attempting to build up unit costs. Otherwise, if the appraisal is to be submitted to a public service commission, it will undoubtedly be found that weak spots will develop under the searching scrutiny of the commission's experts.

(To be continued.)

Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchises. Rates and Service

Grants Rate Increase But Requires Service Betterment.

In the investigation made by the Minnesota Railroad & Warehouse Commission of the Richmond Telephone Co. following its application for authority to increase its rates at Richmond and St. Martin, a surplus of $10,888.60 was found, although the company has but 68 town and 358 rural subscribers.

Excepting for small dividends paid in 1906 and 1907, all the earnings have been put into the property, but there is no evidence showing how much of the earnings was used for construction and how much for maintenance.

Up to the last two years, a large part of the manual and clerical work required to maintain and enlarge the plant was done by Mr. Schwankl, the owner, without charge. Rents and operators' wages were kept down to the minimum, the exchange being located in the drug store and Mrs. Schwankl being the chief operator. Operators' wages averaged $39.75 per month and labor $28 per month. Under these circumstances, the surplus grew in twelve years to $10,888.60.

The earnings have increased from $397.43 in 1905 to $4,696.50 in 1916, and the operating expenses, exclusive of taxes and interest, from $368.25 in 1905 to $3,144.47 in 1916. Night service is not given.

In granting the application to increase its rates, the commission says that the point has been reached in the life of the community and the company when good service and business management suggest the wisdom of having a separate office for the telephone exchange, the employment of a regular lineman and competent operators who can devote their time to the public service, and where the owner of the plant should charge it a reasonable sum for the service which he necessarily renders. The present rates will not yield sufficient money to enable the company to be placed upon a business basis, take care of proper maintenance, a six per cent. depreciation and a reasonable dividend upon the stock.

Hearing on Overcharges Due to Errors of Registering.

Several suggestions as to how the New York Telephone Co. could improve its system and eliminate the possibility of errors resulting in overcharges to subscribers, etc., were discussed before Public Service Commissioner Wm. T. Emmet, at a hearing held in New York last week on a complaint by Dr. S. C. Tracy against the company. Dr. Tracy, who asserted that the company had overcharged him on more than 70 messages since last September, insisted that the company should be ordered to render itemized bills to all subscribers or that coin-slot machines be placed in offices and homes of subscribers. Both of these remedies had been declared by officials of the company to be impracticable on many previous occasions.

D. H. Fuller of the company's engineering department testified that under the present system it would be absolutely impossible to render itemized bills to subscribers without involving an additional equipment of employes and machinery, so vast in proportion as to eliminate almost all possibilities of profit. The registration of calls now is accomplished by an electrical device which records numerically the number of calls made by any particular subscriber. To itemize the calls would require the services of an additional force of operators at each switchboard, who would have to give their entire attention to bookkeeping. "Under such a system," said Mr. Fuller, "the operators would have to make out about 775,000,000 tickets a year. It would vastly increase the possibilities of errors instead of decreasing it and slow up the entire telephone system."

Mr. Fuller's objection to the installation of coin-slot machines in homes and offices was based on the fact that such a step would also involve a very elaborate and expensive equipment, without improving the service in the slightest. Coin-slot machine service, he stated, was much slower than the direct communication with central. It was found to be impractical for general subscribers because no mechanical means had been found of adapting the coin-slot machine to party-line attachments without causing great confusion both to the operator and the subscribers.

Dr. Tracy directed attention to the alleged discrimination involved in the system of overtime charges on local connections. He pointed out that there was no method by which the operators could keep an infallible record of the time which a connection consumed, so that while some subscribers would be charged for all overtime calls, many others would escape.

Traffic Superintendent J. L. Turner asserted that the discrimination was unintentional, and that operators were directed to observe a uniform rule for all calls that lasted more than five minutes. A recent investigation, he said, showed that in fully 12 per cent. of the traffic, where the company was entitled to an overtime charge, no such charge was made.

Few errors were made in charging

did not get, it was asserted. Mr. Turner stated that the percentage of cases where the operator did not get the connection called for and failed to write a credit slip to the credit of the subscriber, was found to amount to 78-100 of 1 per cent.

Dissenting Opinion in Nebraska Interchange Service Case.

Commissioner Taylor has filed a dissenting opinion in the case recently decided by the Nebraska State Railway Commission involving new rates for the Lincoln Telephone & Telegraph Co.'s exchanges at David City and Brainard, Butler county. Commissioner Wilson, who wrote the majority opinion, broadened the case so as to take jurisdiction of all service in the county given by the five different companies that operate there. After dividing the county into zones, he provided a system of interchange rates that enables every telephone patron in the county to get service if he will pay added exchange rates.

In his dissenting opinion, Commissioner Taylor says he cannot subscribe to the theory of the majority opinion that the county constitutes the natural unit for telephone service. The fact that it is a political subdivision does not indicate that it is necessarily a unit for commercial, agricultural, or social purposes.

Civic centers develop without any reference to county lines or township or school district boundaries, and these centers are almost invariably served by a telephone exchange that furnishes intercommunication between a majority, if not all, within its area. Often it happens that this town is connected by commercial or industrial ties with some town or city in another county. He illustrates this point by picking out towns in Butler county, whose trade area covers parts of three other counties and whose interests would be better served by the exchange being made a part of a zone embracing towns in these counties.

Mr. Taylor insists that to require the companies in these towns to provide all their subscribers with such connections and to limit the service to the various classes of subscribers thus defined, would produce a condition, from a practical operating point, that would be impossible. Operators would have time for little else than the policing of calls. It would produce chaotic rate conditions and be prolific of discriminations. Mr. Taylor says:

"If connection with a county seat is the factor which is to establish a unit for telephone service, then I am not able to understand how it is possible to extend it to one subscriber and deny it to another, where all conditions are similar, without producing a serious discrimination. Notwithstanding the demand on the part of the patrons of the company for an extension of the interchange service so as to include all of the exchanges in the county, I am firmly of the belief that they would ultimately be much better served and much better satisfied if a message rate of ten cents for the county was to be established instead of the flat rate for unlimited service herein provided for.

The message rate which I would propose, would reduce to the minimum the trivial and social calls that constitute so large a factor in the congestion of trunk lines and interfere to such a serious extent with important messages. It would remove the necessity for the policing of the service by the subscribers themselves, as is proposed in the order, a remedy that promises to be more aggravating to the telephone user than it is effective in preventing contraband messages.

It would prevent that unjustifiable discrimination that results from the great use of the service by a few at the expense of those who use it little if any. It would discourage the inclination of farm subscribers, because of personal reasons, to demand service from exchanges to which they are not naturally tributary, thus reducing to the minimum the construction of superfluous lines and the re-switching of calls. Such a method would result inevitably in a greatly improved service, and, what is equally important, would place the cost of the service squarely on the shoulders of those who use it.

Where there are overlapping lines between exchanges, it is perhaps necessary to make provision for an exchange of service between farmers residing in the same neighborhood. The social and business relations of farmers in such situations are so close and intimate as to make imperative communication on an unlimited basis. Such an exchange of service, however, is limited to a small service area and can be policed without great difficulty. At the same time the number of subscribers affected being limited, the increase in the traffic is not sufficient to impair the service. Adjustments of this nature could have been arranged in this case. Had that been made, the demand for a county-wide service would have been much less insistent.

Fortunately, the order in this case provides for a test of approximately one year, so that an opportunity will be given to determine from actual experience whether or not the rates proposed are adequate and whether they are so adjusted as to produce the best service."

Mr. Taylor calls attention to the fact that some years ago, when the Surprise company, one of the parties affected by the majority order, asked leave to increase its rate to provide for unlimited interchange of service between its various exchanges, the application was denied because the commission did not approve of that policy. Mr. Taylor says his study of service and rates since then has only strengthened his former opinion.

Local Exchanges Divided Into Groups for Rate Schedules.

In Minnesota the Star Telephone Co. operates exchanges in Farmington, Lakeville, Rosemount, New Market, Prior Lake, Mendota, Lonsdale, and Webster. It has 1,453 telephones, of which 919 are farm, 182 business and 352 residence subscribers. It does not strictly adhere to its published rates, some exchange and rural subscribers being permitted to talk over the whole system while others are limited to certain territory. The rates are not uniform at all exchanges.

In favorably considering the company's application for an increase in local rates of all its exchanges, the commission felt that conditions justify it in grouping the exchanges into two classes, each class to have its own rate. Farmington, with 64 business and 170 residence telephones, should pay a higher rate than Webster, with 18 business and 54 rural telephones.

Farmington, Lakeville, Rosemount, New Market and Prior Lake constitute one class; Mendota, Lonsdale and Webster, another class.

The following schedule of monthly rates is deemed by the commission to be just and reasonable for the service rendered for the exchanges of Farmington, Lakeville, Rosemount, New Market and Prior Lake: Business, one-party, $2.25; business, two-party, $1.75; residence, one-party, $1.75; residence, two-party, $1.50; residence, four-party, $1.25; rural, $1.50, and extension telephones, 50 cents net.

For the exchanges at Mendota, Lonsdale and Webster the monthly rates are: Business, one-party, $1.75; business, two-party, $1.50; residence, one-party, $1.50; residence, two-party, $1.25; rural lines, $1.50, and extension sets, 50 cents net.

A discount of 25 cents a month on business and residence telephones will be allowed if paid during the month in which the service is rendered. Rural subscribers shall pay quarterly in advance with a discount of 25 cents per month if paid during the first month of the quarter.

The new schedule will entitle all subscribers to the use of the whole system. It is effective August 1.

Spokane Rate Adjustment Case Before Washington Commission.

The Washington Public Service Commission has taken jurisdiction of the Home telephone rate case, and served notice on attorneys representing the telephone company and the city of Spokane to prepare their arguments for the commission. This is one of the four or five

THE CONDITIONS

A million men called to the colors.

No immigration for new labor supplies.

Railroads, factories, offices, stores — all calling for woman help.

Rising cost of living.

Increasing use of the telephone.

THE SU

Assure profits by in

Insure them by sta ng

Hire Dollars—not

Eliminate the opera

INSTALL THEU

AUTOMATIC ELECTRIC C

Makers of over 1,000,000 Auto T

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

THE RESULT

More operators needed to handle traffic.

Fewer applications for switchboard positions.

Operators constantly leaving for better jobs.

Operators demanding higher wages.

Less profits for the Telephone Companies.

SUTION

ing expenses.

ng costs.

t

ra

UTOMATIC.

OMPANY :: CHICAGO

to *Telephones in use the world over*

cases in which the city of Spokane is bringing action against the telephone company, or the telephone company is bringing action against the city, to get an adjustment of the rates charged for residence service in the city by the telephone company. The telephone company petitioned the public service commission to take jurisdiction of the rates of the company, and the commission recently heard testimony in Spokane.

The petition presented to the public service commission by the telephone company, asking for a rate rehearing, is a fake, Corporation Counsel Geraghty declares, and the commission should ignore it. In a letter to the Spokane city council he says: "Upon the recent dismissal by the public service commission of the Home Telephone company's application to intervene in an old rate case long pending before the commission, the telephone company procured the filing of a new complaint signed by 26 telephone users, mostly business concerns, nominally challenging the present rates collected by the company, but practically intended to be the means of securing from the public service commission an adjudication of the legality of existing rates.

This complaint was circulated by an employe of the telephone company, and the concerns signing it, of course, expect no relief and signed solely upon the solicitation of the telephone company itself. The commission should not be called upon to thrash out moot questions. This proceeding is intended solely to forestall any adverse ruling of the courts in the litigation now pending between the city and the telephone company and between users and the company.

In June, 1914, the Pacific company openly acknowledged to the city council its control of the Home company, and agreed to procure the surrender to the city of the Home franchise. In January, 1915, the Pacific company notified the city that, having no franchise authorizing it to carry on business in the city, it had turned its property over to the Home company and that thereafter the telephone exchange would be conducted by the latter company under the Home franchise. Simultaneously with this notification to the city the Home company filed with the public service commission in Olympia the Pacific schedule of rates, seeking thereby to relieve itself from the agreement as to rates which was the very essence of the Home franchise.

The city as yet is not a party to the latest proceeding before the public service commission, but I feel that the effort of the company should not go unchallenged by the city. I would accordingly recommend that I be authorized to intervene in the case on behalf of the city, and object to the inquiry sought at this time."

Believes in Policy of Switchboard Units and Toll Charges.

The Surprise Telephone Co., which operates five exchanges in Butler county, Nebraska, is the latest convert to the theory that the best policy for rate-making in a telephone system is to make each switchboard a unit and charge a moderate toll rate for every call to every other exchange.

In a letter to the Nebraska commission, D. L. Sylvester, the manager, says that the experience of the company, which has covered a number of years, has taught its stockholders that lesson. The Surprise company was organized a number of years ago and, notwithstanding low rates, was able to command sufficient capital to establish 11 exchanges in Butler county, two of them at strong competitive points with the Bell. It had in force for years a flat rate that permitted subscribers to talk anywhere in the county.

Several years ago, faced with the necessity of spending $50,000 to take care of realized depreciation, its stockholders refused to put up the necessary money, and instead sold half of its property to the Lincoln company, which had previously purchased Bell exchanges at David City and Brainard. A recent order of the state commission makes the company one of five that are required to make rates for four zones of service in the county, the protests of farmers who objected to being deprived of county service being heeded by the regulatory board.

At the same time it was ordered to answer a complaint filed by 150 patrons of its exchange at Shelby, over the line in Polk county. The subscribers claimed that the property was being allowed to depreciate, was not looked after and that the service was bad. Mr. Sylvester replies that the chief reason is that under the system of free exchange of calls, it is impossible to furnish reasonably good service and that a contributing reason is the presence of a high tension power wire at Shelby.

Dallas (Texas) Automatic Accepts Merger Francise.

Formal acceptance of the automatic telephone franchise voted by the citizens of Dallas, Texas, last April has been filed by J. C. Casler, president of the Dallas Automatic Telephone Co. Mr. Casler's acceptance also embodied an acceptance of the reduction in valuation made by A. C. Scott. The original valuation was estimated at $2,600,000 when the franchise ordinance was passed, but Mr. Scott's report fixed the valuation at $2,521,279.84.

The acceptance of this franchise and the reduced valuation makes the second step towards the merger of the Automatic and Southwestern telephone systems contemplated in the drafting of the franchise. This franchise gives the Automatic company the right to acquire and operate the properties of the Southwestern system in Dallas, or to form a merger with that company.

The franchise accepted by Mr. Casler also provided that the city commission shall have the right to fix and determine the maximum rates which may be charged by the grantee under the merger system; also that the system shall be under the direction of the supervisor of public utilities.

The merger must be submitted to the people at a general election. In addition to voting on the question of permitting a merger, three other important matters will be referred to the people in regard to the merged company, namely, the rate of return, the maximum rates for service and the valuation. The franchise specifically provides there shall be no raise in rates for two years after consolidation, no matter what the losses may be.

The franchise as applied to the Automatic company is an indeterminate service-at-cost grant. A limitation on the service-at-cost plan exists in the provision that no increases in rates must be made for 11 years, or until the present franchise held by the company will have expired, and that the gross receipts tax must be paid during this period.

The next step in the merger probably will be the passage of an ordinance by the city commission fixing the valuation on which the Southwestern properties may be acquired by the Automatic company, the rates and the rate of return to be permitted under the merger. The valuation now being made of the Southwestern properties will be used as the basis for determining the valuation for the merger.

Before the Southwestern properties can then be acquired by the Automatic company the former must file with the city commission a notice assenting to the valuation fixed and the rates and rate of return to be permitted under the merger. If this is done and the merger is made, the entire matter will then be submitted to a vote of the people for ratification or rejection at the next succeeding general election.

Does Line Switching But Is a Common Carrier.

N. E. Austin of Stockville has been informed by the Nebraska State Railway Commission that he is a common carrier. Mr. Austin owns a telephone switchboard located in his house, operated solely by himself and his wife. This board is utilized solely for the purpose of doing the switching for eight small companies that are located in the neighborhood, for which service he receives 25 cents a month for each telephone.

When requested by the commission to fill out a set of blanks furnished to him as to other companies, he protested, insisting that he was not amenable. The commission instructed its secretary to notify him that by his own showing he is a common carrier and must make reports.

Tax Valuations of Ohio Telephone Companies Greatly Increased.

Although Ohio telephone companies, owing to the high cost of materials, have not added much new construction during the last year and some have made no efforts toward improvements, except to keep their systems in good working condition, the Ohio State Tax Commission has boosted the valuation of their properties for taxation $3,762,000.

The new valuation, just announced, is $81,563,240, against $77,801,240 in 1916. In 1916 the gain over 1915 was $2,490,790. During 1917 the decrease in valuations under 1916 was $457,340, but this was overcome by the tax commission in its valuations of new companies and increases on old ones.

Telephone properties in Ohio have shown a rapid growth in valuation for taxes, and in the last seven years the increase has been more than 374 per cent. In 1910 the valuation was $21,654,529, and for 1917 nearly four times that.

Injunction Stops Chicago Automatic Service Discontinuance.

Judge Richard S. Tuthill in the Circuit Court at Chicago on July 31 issued a temporary injunction restraining the Chicago Tunnel Co. and the Illinois Telegraph & Telephone Co. from discontinuing automatic telephone service at midnight July 31 without the permission of the Illinois Public Utilities Commission.

The injunction was issued as a result of a petition filed July 26 by John Fitzpatrick, president of the Chicago Federation of Labor, for a temporary injunction on behalf of the taxpayers to prevent dismantling of the plant, which he claims to be city property under the franchise forfeiture.

In his bill Mr. Fitzpatrick contends the forfeiture ordinance made all the telephone plant the city's own property. He charged that dismantling of the plant and leasing of tunnel space to interests antagonistic to the city were being planned. He petitioned the court to set aside the council permission given for such procedure.

Summary of State Commission Hearings and Rulings.

ILLINOIS.

July 18: Order entered approving the agreement between the Springfield Gas & Electric Co., the Inter-State Independent Telephone & Telegraph Co. and the Boynton Telephone Co. for joint use of wires of the Inter-State Independent Telephone & Telegraph Co. on the Beardstown road, west of Springfield.

July 31: Hearing at Springfield by Commissioner Lucey on application of the Scottsville Telephone Co., Willis Hayes, president, for permission to change its telephone rates at Scottville. Objection filed by Bert Woolfolk, et al., of Scottville. No. 6175.

July 31: Hearing at Springfield before Commissioner Lucey on the application of the Highland Telephone Co. for authority to change telephone rates in the village of Highland. No. 7045.

INDIANA.

July 17: Commission denied the petition of the Tipton Telephone Co., filed in 1916, for a raise in rates. The order denying the change was written by Commissioner Edwin Corr and states that the company has an abundance of salaried officers. He showed where figures compiled by the company to show a great need for a raise in rates had been erroneously gotten up and how, upon proper figuring, the necessity did not appear so great.

MINNESOTA.

July 25: Order issued relative to the application of the Richmond Telephone Co. to increase its exchange and farm line rates at Richmond and St. Martin. The commission finds that the present rates are inadequate. The company is required to furnish continuous 24-hour service and to move its exchange to a separate office. It is permitted to charge as reasonable maximum rates the following: In Richmond, business single party, $2.25; residence, $1.75 for one party and $1.50 for two-party service. In St. Martin, the business rate is $2 and the residence single party is $1.75 and two-party $1.50. A discount of 25 cents a month will be allowed on bills paid before the 15th of the month. Multi-party rural service is to be $1.50 a month with a 25-cent discount for payment in advance before the end of the first month of the quarter. The new schedule became effective August 1.

July 25: In the application of the Star Telephone Co. for authority to increase its local exchange rates at all of its exchanges, the commission decided that the present rates are inadequate and authorized an increase. The exchanges were grouped into two classes, each with its own rate. Each subscriber is permitted to use the complete system upon payment of the rate authorized. The new schedule became effective August 1.

MISSOURI.

July 27: The commission authorized E. H. Winsel to sell and J. R. Stephens to purchase the Leasburg Telephone Co., of Leasburg, Mo., at an agreed price of $1,189.

NEBRASKA.

July 22: Complaint of John Alem against Winnebago Telephone Co. that many lines are down and that no effort has been made to better general condition after complaints were personally lodged. The owner, A. N. Metheny, at present a resident of Minnesota, was notified to show cause why each rural line should not be put into good service.

July 23: Application of Davenport & Kiowa Telephone Co. for permission to borrow $1,800 on notes for purpose of building a new exchange at Davenport, granted.

July 23: Application of Campbell Telephone Co. for permission to issue additional stock to build rural lines, granted.

July 24: Complaint of 150 subscribers to the Shelby exchange as to poor service Surprise Telephone Co., which operates the exchange, filed reply that good service cannot be given under a flat monthly charge for added exchange service and that at Shelby a high-tension power wire causes interference.

July 24: In the application of Lincoln Telephone & Telegraph Co. for permission to establish a grounded farm line rate of $1.25 at its Murray exchange, with limit of ten parties on a line, along with existing rate of $1 for unlimited number, the authority was granted.

July 25: The application of Wyoming & Nebraska Telephone Co. for permission to increase business rates from $2 to $2.25 and residence rates from $1.50 to $1.75 on the Rushville exchange, subject to 25-cent discount for payment before 10th of month, was granted.

July 27: In the matter of the order of the commission to provide a system of interchange rates between the five companies serving Butler county, the Lincoln, Surprise, Ulysses, Abie and Linwood companies, providing for flat rate of added exchange service, Commissioner Taylor filed a dissenting opinion, holding that exchanges should be units and a ten-cent rate between exchanges in the county would produce better service and better satisfaction.

July 27: Complaint filed by G. H. Hasebrock, of Holstein, that a poor conditon of repairs exists on lines of Glenwood Telephone Co.

July 27: Application filed by Wyoming & Nebraska Telephone Co. for permission to dispense with its switchboard at the Whitney exchange.

July 27: Application of Lincoln Telephone & Telegraph Co. for permission to readjust rates on Talmage exchange, filed.

July 27: Application filed by Nebraska Telephone Co. to cancel its four-party business rate on the Grand Island exchange and its four-party residence rates on the Pender exchange.

OHIO.

July 20: The Ada Telephone Exchange Co., of Ada, asked for the authority to purchase the establishment of the Dunkirk Mutual Telephone Co. at Dunkirk. The price named in the petition was $7,000. There are at present two telephone exchanges in Dunkirk, both of which are located in the same block. One is the Mutual company and the other is controlled by the Ada exchange company.

July 23: Application filed for the approval of the proposed consolidation of the Citizens Telephone Co., of Coshocton, and the Central Union Telephone Co. under the name of the Coshocton Telephone Co., which has an authorized capital stock of $150,000 in 1,500 shares. It is explained that the Citizens Telephone Co. is to sell its property to the new company for $90,000 of which $75,000 is to be paid in common stock of the new company and $15,000 in seven per cent. notes payable in one year.

OREGON.

July 20: Addition to rate schedule for Home Telephone Co., of Portland, filed with commission by Oswald West. Company offers to all new subscribers who install Home telephones three months' service free. The tariff filed also includes the old provision that after the first three months free the charges shall be $2.25 per month, with 25 cents cut off if bills are paid before the tenth of the month.

WISCONSIN.

July 31: Hearing at Downing in the case of Hardahl Co. et al. vs. the West Wisconsin Telephone Co. and Boyceville Telephone Co., as to rates and service. No. U-1115.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

731. What is negative supervision? Why must the busy line signal in the toll switchboard multiple be negative in operation from the standpoint of supervision?

732. Why is the target type of busy toll line signal sometimes found to be unsuitable for use? What is the greatest advantage in the use of the miniature switchboard lamp for the busy toll line signal?

733. What is the difference between the wiring of toll line busy signals of the target type and lamp signals? Why is it of small importance that the lamps in such an arrangement as is shown in Fig. 224 do not all receive the same current supply?

734. State briefly the operating advantages of the lamp busy line signal.

CHAPTER XXVI. The Multiple Toll Switchboard (Continued).

735. *Heavy toll users' switchboard terminals.*—There is a class of line circuits found in modern toll switchboards that may assume either the arrangement of the local exchange circuits, when they are common battery, or of the forms taken by the toll circuits. This class of toll circuit is designed to afford quick and easy access to the toll plant for those subscribers who are heavy toll service users.

The circuit in such cases terminates in the toll switchboard in a toll line equipment and in a telephone substation at the subscriber's premises. By the employment of such arrangements, the heavy toll user is enabled to call the toll switchboard direct, eliminating the local operating delay and possible transmission loss entirely.

When such a circuit terminates in the toll switchboard in the usual toll line equipment, it is essential that a magneto telephone set be installed at the substation. In other cases, the line equipment in the toll switchboard may be of the common battery type and then the instrument at the local substation is of the ordinary common battery type. It is obvious that the nature of the toll switchboard cord circuit will determine, in any given case, which type of equipment shall be employed in the substation.

In any event, such circuits are carried through the toll switchboard multiple and are handled in operating exactly the same as toll line circuits. It is the usual practice, however, to install the multiple jacks for such circuits in a space somewhat distinct from that occupied by the toll line multiple jacks. This space is usually between the multiple jacks and the answering jacks and is located in about the same relative position as the multiple jacks for the service toll trunks.

736. *Diversified character of toll switchboard operators' duties.*—It is obvious that the modern multiple toll switchboard is a combination of several types of equipment. The operators handling the traffic on incoming toll circuits are provided with operating equipment that is best suited for handling this class of service. The operators, on the other hand, who serve the public at the recording positions of the switchboard are provided with equipment of a very different character. In the same way it is true that operators at the supervision and information desks are provided with equipment designed especially for the division of work falling to their positions.

In other words, the character of the work fixes the character of the equipment for each portion of the toll switchboard. This means, for illustration, that there is no one standard type of toll switchboard cord equipment which is representative, to the exclusion of all other types, of all the toll switchboard cord equipments.

737. *Cord circuits for the toll switchboard line positions.*—The cord circuit equipment adapted for the use of the line position operators may, therefore, be considered in a class by itself. The cord circuits found on the other divisions of the switchboard may also be placed in distinctive classes for the purpose of description and consideration.

For use on the toll line circuit positions, the cord circuit may be a simple magneto multiple circuit to connect one toll line circuit with another. It may be intended, on the other hand, to effect the connection between a toll line and a service toll trunk to the local switchboard. In the latter case the wiring arrangement of the circuit is somewhat more complicated and affords the means of supplying the current for the operation of the local telephone transmitter on the local or trunk end of the connection.

In the first case, the cord circuit is known as a toll-to-toll cord circuit and in the latter case it is known as a combination, or toll-to-local cord circuit. The relative number of each type required on any given operator's position is determined by the relative values of the two kinds of traffic.

Ordinarily, in any toll switchboard in the average size of telephone office. the traffic from the local stations to the toll lines and from the toll lines to the local stations, is much heavier than the traffic between the toll line circuits themselves. This is not by any means a universally true statement, however, as very many toll switchboards are in service in which switching between the toll line circuits forms the bulk of the traffic handled.

738. *The toll-to-toll multiple cord circuit.*—The actual arrangement of the toll-to-toll cord circuit is very simple. It is only necessary to provide a conducting path from one plug to the other and to arrange, on this conducting path, a means of signaling the toll operator when the connection is to be removed. Assured of these two operating essentials, the arrangement of the elements of the cord circuit in the simplest possible manner is desirable. Such a cord circuit for use with the ordinary audible busy test is shown in Fig. 225.

When the plug of this cord circuit is inserted into the jack of the toll line circuit, the resulting flow of current from the common battery through the winding of the relay, 2, or the coil, 1, as the case may be, operates the cut-off relay of the line and places the busy test potential on

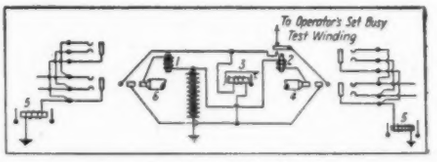


Fig. 225. Toll-to-Toll Multiple-Cord Circuit.

the sleeve of the line jack at the same time.

The cord circuit is not precisely alike on the two ends. The relay, 2, is connected with the calling end of the circuit. When the operator is about to in-

sert the calling plug into the jack of the called line, she tests the sleeve or thimble of the jack with the tip of the plug.

When the plug is completely inserted, the circuit from its tip to the busy-test winding of the operator's set coil is broken and the tip connected through to the answering plug by the operation of the armature of the relay, 2. Now this switching relay, 2, is operated when the cut-off relay is operated, the same current flowing through the windings of both. This flow of current, like that through the coil, 1, is sufficient to assure the necessary increase of potential on the sleeve of the jack.

739. *The clearing-out drop in the toll-to-toll cord circuit.*—The clearing-out drop, 3, is connected directly across the two strands of the cord circuit. Any ringing current sent out from either of the two connected lines will be shunted by the winding of this drop. As a result of the passage of ringing current through its windings when the conversation is completed, the clearing-out drop is operated, the signal is displayed, and the operator removes the connection.

It is obvious that such a drop signal, being bridged directly across the talking circuit, must present very high reactance to telephonic voice-carrying current in order to prevent a very high transmission loss through its windings. On the other hand, it must present a very low reactance to the ringing current so that it may be easily operated by the ring-off current at the close of the conversation.

The fact that the frequency of the voice-carrying current is very high and that of the ringing current comparatively low, affords a means of designing the drop winding to accomplish this result.

It is to be remembered that the ohmic resistance of a drop signal is not the sole criterion by which its safety factor as to transmission may be judged. Low ohmic resistance may, with suitable magnetic circuit arrangements, be found in drops of very high inductance reactance to telephonic voice-carrying currents. On the other hand, high ohmic resistance may be found in drops so constructed as to offer comparatively low reactance to the telephonic voice-carrying currents and too high impedance (reactance effect combined with resistance effect) to the ringing current of the ring-off signal.

740. *Ringing and listening key arrangement of toll-to-toll cord circuit.*—It is to be noted that the circuit from plug to plug over the tip strand of the cord circuit in Fig. 225 is open until the armature of relay 2, has been operated. This occurs after the calling plug has been inserted into the line jack. The cut-off relays, 5, of two toll line circuits are represented in outline only and all listening and ringing keys are omitted.

Such a cord circuit should be provided with ringing keys to permit ringing independently on both cords. This is necessary in order that the toll operator may call on either one or both of the two circuits when effecting a connection between them.

It is customary, in some cases, to provide that the operator may switch her telephone set to both connected circuits independently of each other or so that she may talk to both at the same time. Local conditions and operating methods govern the precise arrangement of the cord-key equipment however. It is very plain that any desired switching arrangement may be very easily provided when conditions warrant it.

741. *The toll-to-toll multiple cord circuit.*—The cord circuit shown in Fig. 225 would be used by the line operator in effecting a connection between two long distance circuits in normal condition. Should one or both of the circuits be noisy, it would be necessary to connect them with a cord circuit in which a repeating coil was interposed between the two terminals of the connection. Special methods of toll operating, such as the use of repeating coils, will be described after the *typical* simple operating circuit arrangements have been outlined.

When the line operator is to connect a toll line circuit with a service toll trunk leading to a local common battery telephone substation, the plain magneto cord circuit may not be employed. Provision must be made, in some way, for the current supply to the local common battery telephone transmitter.

In very many important long distance offices this task is relegated to the toll trunk itself rather than the toll cord circuit. The simpler arrangement, however, is based upon an arrangement of the toll service trunk in mutiple toll switchboards which is free of all repeating coils in the talking circuit. In such cases the service trunk merely serves as an extension of the talking conductors of the toll switchboard cord circuit to the terminals of the local common battery telephone circuit. For such a trunk circuit the toll combination cord circuit arrangement shown in Fig. 226 may be used.

742. *Operation of the toll-to-local multiple cord circuit*—One end of this cord circuit, Fig. 226, for the local portion of the completed connection, is a full common battery cord circuit arrangement. The other end, for the magneto portion of the completed connection is a simple local battery magneto multiple cord circuit arrangement. The transmission link between the two ends of such an arrangement is obtained through the two windings of the repeating coil and is inductive and not conductive.

In the circuit as shown, the relay, 12, is operated by the flow of current from the common battery when the local plug is inserted into the trunk jack. As this relay is in series, at this time, with the relay or coil on the third or test contact of the trunk jack, a busy-test potential condition is established on the trunk jack

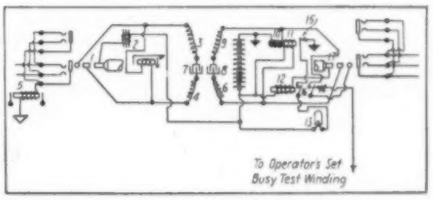


Fig. 226. Combination of Toll-to-Local Multiple-Cord Circuit.

at the same time. The circuit established through the sleeve of the trunk and the sleeve of the plug may be easily traced.

When the relay, 12, operates its armature, a circuit is established for the supervisory lamp, 13. This may be traced as follows: Starting from the positive or ground terminal of the common battery through the normally-closed relay contact, 15, the operated contact, 16, the supervisory lamp, 13, to the non-grounded terminal of the battery. Whenever the plug rests in the jack therefore, and the supervisory relay contact springs at 15 are not operated, the supervisory lamp will be bright.

Should the receiver be removed from the local telephone to whose line circuit the trunk has been connected, the supervisory relay will be operated as the result of the current flow from the common battery through its twin windings, 10 and 11, the tip and ring conductors of the trunk, and the tip and ring of the local line. The toll operator, having rung the local station, is apprised when the local call is answered by the supervisory lamp.

The magneto end of the combination cord circuit is placed in the toll line multiple, connecting for telephonic purposes, the toll line and the local common battery substation through the repeating coil. The condensers, 7 and 8, improve transmission through the repeating coil by neutralizing, to some extent, the reactance effect upon transmission of the windings, 3-4, and 9-10. The condenser, 8, also prevents the premature operation of the supervisory relay by current from the battery that would, otherwise, pass through the windings of the repeating coil from the tip strand to the ring strand of the cord.

(To be continued.)

Elyria, Ohio, Telephone Co. to Install Automatic.

The directors of the Elyria Telephone Co., Elyria, Ohio, have authorized the expenditure of $150,000 to include a new building to cost $36,000 which will house the $73,000 automatic telephone system to be installed in that city.

High Lights on the Present Times as Regards the Telephone and Its Operators.

Practical Subjects — Discussions

Sunshine and Shadows Along the Telephone Trail.

By Well Clay.

In the good old days before the craze
  Of the buzz wagons came about,
The old gray horse, as a matter of course,
  Was hitched to the old turnout,
When the time came 'round to go to town.
  This usually took all day,
For the old gray mare never turned a hair—
  Four miles an hour all the way.

They took a "snack" to last them back,
  For money they must not waste,
And it spoiled the treat when they came to eat
  When a "quarter" was charged for a taste.
A calico "gown" with a flounce around,
  Some ribbon and a pair of shoes
Was good enough for "her," while "he" might prefer
  Some tobacker and a "snort" of booze.

When the day was spent they homeward went,
  As the sun was towards the west
To travel was all right but when it came night
  It were better to be at home and rest.
Now things have changed, new schedules are arranged.
  The old horse rests in his stall,
When night shuts down, they start to town—
  It only takes some minutes, that is all.

At the close of day when the town bands play
  And the doors of the movies open wide;
With a tooting of the horn, an auto crowd is born—
  (You could take a census of the countryside).
While mother is a stopping to do a little shopping,
  And father goes to buy a little gasoline;
The dealer may take his order for a rake,
  A mower or some other new machine.

When the band has ceased to blow and over is the show,
  Then ice creams and the luncheons are at hand
(For we only live this once and a man would be a dunce
  If he never, never slipped the rubber band).
When the stars are in the sky and the moon is mounting high,
  Homeward they go tooting through the night.
Old Dobbin in his stall stirs a little, that is all,
  For he thinks the autos are all right.

It is a far cry from the old times to the new, and we doubt if any one in the old times really had a vision of half of what has come to pass.

Old Mother Shipton was credited with having had quite a line on events which were to happen, but she fell down on the main event of the world's coming to an end because she couldn't find anything which rhymed with the right year, so she saved the rhythm and sacrificed the main date. She probably never saw, even in a vision, any of the things she wrote about. The fact that so many of her prophecies came true is because so much has happened that she couldn't have missed them if she tried.

A good deal has happened, even since I began writing these articles, which was unexpected aside from the fact that they are still running. Some more things are going to happen soon that we all think but little about now. The stirrings in the pregnant womb of time do not seem to worry the people of the world, so used are they to having tremendous things happen right along.

For some time I have had an idea growing in my head that right now, while all the Independents are busy helping the government and conserving their individual plants the best they can on a rapidly-receding value of total buying power of income, our friends, the Bell crowd, will not only help the government all they can openly and meritoriously, but will figure that in the grand shuffle of events a few jokers inserted in the general deck will pass unnoticed for a while at least. Even if they were discovered eventually, they would have taken a few tricks for their side anyhow. It may be just an idea, but it keeps coming up like the whale found Jonah was trying to do, so I thought I would get rid of it and let some smarter man find out the answer.

Speaking of momentous things happening, as I write these lines there is being enacted at Washington an event which will change the course of millions of lives and probably decide the fate of nations around the world. I refer to the drawings to decide who of our young men shall go to war and who shall remain at home to help back them up. Five years ago if someone had told you that on the 20th of July, 1917, the United States would have a second Democratic administration in succession and would raise an army by the draft amounting to a million men, would you have believed him? Hardly.

If the wheat market had fluctuated ten cents a bushel in a single day's trading, the country would have gone wild with apprehension over what portended. Today a man says casually "I see wheat took a jump of 60 cents yesterday," and you say, "'Zat so?" and keep right on talking about the best way of testing out a spark plug for your auto.

We are full up on dope and nothing jars us any more. We merely accept whatever comes and take it as part of the manifest destiny that has been dealt out as our share in this momentous period of the world.

We look back on the horrors of the slave mart and the awful custom of advertising the sale of human beings on the auction block. We think that if we were to be confronted with a spectacle such as was common in the South 60 years ago, we would arise in our righteous wrath and denounce the perpetrators of such an ungodly procedure. Would we? The chances are that we would be so used to them we would not even sense that there was anything wrong about the matter at all. Most people were so full of the dope of slavery in those times that they did not get any jolts at all from such a sight.

Some managers get so used to seeing their lines in a happy-go-lucky sort of shape, as I said a few weeks back, that the sight of a hanging line, a rotting pin, or a leaning pole, no longer affects them as it should and they get no jolt until some lineman gets hurt or an outsider is injured. Then they wake up and pay the price—if they can.

Are we so full of the dope that everything is going on as it should in the telephone field, that Independents need to hold no conventions or conferences while the war lasts?

Do you think that there are no conferences being held every day and hour at the headquarters of the A. T. & T., aside from those which they are holding with the government at Washington?

I believe that every state should see a small convention of telephone men in August, whether they have any program or not, just to see if the grand aggregation of news items which would creep into such gatherings would not contain a few which would require our attention before the cessation of hostilities with Germany.

APHORISM: Hope is sustaining but recollections are sometimes painful.

Lightning Arresters and Their Action on a Mountain.

I desire to add some further explanations and remarks to the article by me entitled "Lightning Arresters and Their Action on a Mountain," published in TELEPHONY of June 30, page 31, as I fear that I failed to make some points clear. I am more inclined to do so on account of a letter which I have received from Claude Disbrow of the Tuscola Farmers' Telephone Co., Millington, Mich.

Mr. Disbrow very kindly writes to tell me why he thinks the arresters failed, viz.: that the telephone being located on top of a mountain, there is very likely little soil above the rock and therefore the "ground" was poor, too dry, not being deep enough. He doubtless had in mind a very high conical mountain such as we see in the pictures in old-time geographies, perhaps a thousand feet high, and mostly bare rock.

This is quite natural as I failed to

describe the mountain, which is only about 500 feet above the main line extension. It is not a sharp-topped peak, but rather a flat-topped one; not an isolated mountain, but part of a rugged sub or minor range of the Blue Ridge, the elevation of the house being about 3,100 feet above sea level. Neither is the rock bare of soil everywhere, as the depth of soil ranges from bare rock to ten feet deep or more. Much of the land on the mountain is cultivated and raises crops like corn, etc. Indeed the ground-rod referred to is in a garden and the nearest pole to the house is set in soil to a depth of about four feet, with ground-rod next to it.

Relative to the moisture in the soil here, I will state that *no* portion of the Eastern states has as great a rainfall as this section, the annual amount being from 63 to 110 inches, with an average annual amount of about 80 inches. The heavy rainfall of this section is regarded as a very interesting phenomenon by meterologists. The soil here very rarely becomes dry to any depth. In drouths which do sometimes occur it is unusual for the soil to become dry for more than an inch or two below the surface.

In 1894 I conducted some soil moisture observations for the Bureau of Soils, Prof. Milton Whitney, chief, U. S. Department of Agriculture, which at that time was studying the soil moisture-content of various soils all over the United States. A sample of the actual soil was taken and sent to Washington where the actual moisture content was determined.

Such observations for this locality showed that the soil never became extremely dry, being about average in capacity for holding moisture. Those soils holding the most were the very fine grained corn-belt soils, and those holding the least, the *sand* soils of the coast —pure sand sometimes. I fully realize the conditions in Mr. Disbrow's country —Michigan—as I am a native to northern Ohio, a similar and nearby section. There the rainfall is very light and the soil becomes so dry that in peaty situations in old glacial lake swamps, and pastures, it sometimes during drouths in the fall catches fire and burns to a depth of several feet.

But conditions are entirely different in the Blue Ridge of North Carolina, which has damp air, heavy rainfall, and none of the conical mountains of the old geographies, the Blue Ridge topography being what the geologists call ancient. The mountains are in "old age," but not glaciated, whereas Michigan is all glaciated.

It was stated in my former article that I found four trees onto which the lightning bolt had jumped after striking the line. Since that time I have located two more, making six, viz.: Four white pines, one chestnut and one apple tree. The last sentence of my article is not correct as printed, it should be as follows: "We now have a different arrangement of arresters, which consists of four, two in the house and two on the pole."

It is, of course, known by all electricians, and expert telephone men, that lightning arresters are only of value as protection against the induced effects of lightning, but I am not an electrician, and most of the literature fails to make this point clear. Very rarely, is it stated in the books, that there is no protection from direct strokes.

I have recently received letters from some authorities on the subject of protection from lightning and they all agree that no arrester is of much value against a direct stroke such as the one in question. Undoubtedly the stroke in question was a very severe stroke. The writer was about 50 yards from the line when line was struck—perhaps that near the actual point struck—and the sound was loud enough to have wakened the dead if such were possible.

In this section, comprising a portion of the U. S. Savannah National Forest, the number of forest trees struck by lightning is very large. Careful observation shows trees which have been struck at all times past, from yesterday to as far back as a hundred years or more. The most prominent trees are by no means the ones always or usually struck—small saplings may suffer and tall trees nearby escape.

The telephone lines suffer heavily, many poles being shattered—lightning rods every tenth pole seem to give slight protection.

In my former notes, I neglected to state that nowhere do the U. S. Forest Service telephone lines come in contact with power lines. The greatest trouble on these lines are the "frying," cracking, and roaring noises which sometimes are so extreme as to almost prevent transmission, especially in summer. On some 11 miles of metallic lines owned by Forest Service, they are not so bad, but still bad enough.

In TELEPHONY of June 30 I note an article by R. W. Weightman on "British Colonial Telephone Lines." In this very interesting article he speaks of using the Chapman lightning arresters on telephone lines, "on the pole at suitable intervals," in South Africa. This idea of using arresters on the poles at intervals has not been tried by the U. S. Forest Service in this section. I believe it should be. In any remarks of mine relative to the U. S. Forest Service, it is to be distinctly understood that I have no connection whatever with that service, nor am I authorized to speak for it. I write merely as an observer.

Although this is a very remote section, I believe few remote rural sections had telephone lines earlier. As early as 1889 Dr. Lucas, of corundum mine fame, had a telephone line in operation from Walhalla, S. C., to Franklin, N. C.

I should like to hear from some one who has used the Argus arrester of Foote, Pierson & Co. This arrester is so different from most of them I should like to know if it has any special merits in practice—and the same data for the Chapman arrester.

Barry C. Hawkins,
Box 78. Highbank, N. C.

Indianapolis Company Uses Show Window for Advertising.

A novel educational and advertising stunt has just been put on at Indianapolis, Ind., by J. H. Ainsworth, of the Indianapolis Telephone Co.

A store window was secured having a platform floor and two automatic wall telephones, connected to the central office by individual lines, were mounted upon uprights, one on each side of the window. On one of the boards an automatic first selector switch was mounted.

Each telephone upright was equipped with a sign giving the number of the telephone, while the switch was mounted upon a card bearing the words: "This is an automatic operator." An easel was provided upon which cards, 28 ins. by 22 ins., bearing advertising matter "sign-written" was shown.

Marvin Mann, a blind man familiar with operating the automatic, was placed in the window. Besides displaying the placards, he made test calls from one telephone to the other, and generally illustrated the simplicity of the automatic calling and promptness of the service. A banner across the window announced the demonstration and the fact that the operator was blind.

Some pertinent signs were displayed, among which were the following:

"The horse car was all right in its day,
But who wants to ride in a horse car now?
Manual service is real horse car stuff!
A trial will prove this."

"Competing companies' own experts on a test made by themselves in a large city where automatic service had been in use for six years, found that over 90 per cent. of the business telephone traffic was carried over the automatic. The reason was secret and superior service."

"Your secrets are as safe on the automatic individual lines as in your office or home or behind closed doors. All other kinds of lines are monitored in the central office. Automatic circuits *are not monitored.* You never heard of an automatic operator being called to the witness stand—others have been time and again.

"Think this over.

"You will like the automatic better."

"Come in and let me show you how to use the automatic in the dark. *I use it that way all the time.*"

The demonstration was a marvel to many. More than 12,000 persons stopped to watch the operator and read the signs.

Creosote is Creosote, *but—*

WE sell crude commercial creosote—millions of gallons of it, but we only recommend it for use in the Pressure Process. Green poles cannot be successfully treated by non-pressure processes.

The OPEN-TANK SYSTEM and the BRUSH METHOD require a *refined* coal-tar creosote. The physical characteristics of the commercial creosotes make them unfit for practical use in these treatments.

Refinement consists of chilling the crude creosotes, solidifying the naphthalene and removing it, draining off the remaining liquid, and distilling it to rigid specifications drawn to meet the special requirements of the Brush Method and Open-Tank System; obtaining an oil liquid at normal temperature, penetrating the wood easily, of high preservative value, and positively permanent—*i. e.*, practically non-volatile.

For the protection of consumers against the misuse of the phrase "refined creosote," we have named our refined creosote "Carbosota—*Grade-One Liquid Creosote Oil.*"

Barrett's Carbosota Grade-One Liquid Creosote Oil

CARBOSOTA is simply a pure coal-tar creosote oil, refined for the purpose, conforming to standard specifications.

The United States Department of Agriculture, in Bulletin No. 744, says: "It [coal-tar creosote] is considered one of the most efficient preservatives against decay so far developed."

COAL-TAR CREOSOTE has been used for the preservation of wood from decay for nearly four-score years.

Booklet regarding the CARBOSOTA treatment free on request.

The Barrett Company

New York Chicago Philadelphia Boston St. Louis Cleveland Cincinnati Pittsburgh Detroit
Birmingham Kansas City Minneapolis Nashville Salt Lake City Seattle Peoria
THE PATERSON MANUFACTURING COMPANY, Limited: Montreal Toronto Winnipeg Vancouver
St. John, N. B. Halifax, N. S. Sydney, N. S.

Reinforcement with Creosoted Stub.
(Courtesy of U. S. Forest Products Laboratory)

A Permanent Transmission Line.
(Courtesy Lindsley Bros. Co., Minneapolis)

Decay at base of Telephone Pole.
(Courtesy of U. S. Forest Products Laboratory)

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

Biographical and Personal Notes

William Meade Brown, general auditor of the Central Home Telephone & Telegraph Co. and the Independent Long Distance Telephone & Telegraph Co., Louisville, Ky., was born in Jefferson County, Ky., January 21, 1872.

Graduating from the University of

W. M. Brown.

Louisville in 1887 in the classics, sciences and mathematics, Mr. Brown took a two years' postgraduate course in civil engineering, which he finished in 1889. During the next two years he was employed as bookkeeper in one of the largest banks in Kansas City, Mo. He then took charge of his father's farm and dairy business, which he operated successfully until 1899, at which time his father died.

Entering the telephone field in 1900, Mr. Brown selected the plant department, as he felt that his knowledge of civil engineering would be of benefit to him in mastering the construction of telephone properties. Two years later he was made general auditor of the Independent Long Distance Telephone & Telegraph Co., which position he still holds. In 1910 he was also made general auditor of the Central Home and its subsidiary properties.

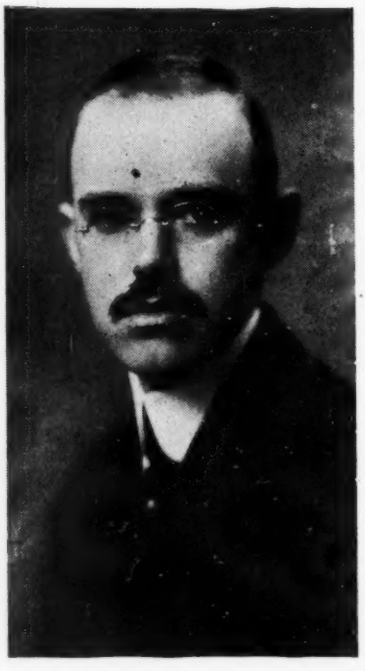
Mr. Brown is modest and energetic and a deep, comprehensive thinker. Broad-minded, very thorough in his work and most dependable, Mr. Brown is a valuable member of the efficient management of the Central Home and Independent Long Distance systems.

He is a member of the standing accounting committee of the United States Independent Telephone Association.

Edward Mayne Prisk, general manager of the Consolidated Telephone Co., of Hazleton, Pa., after receiving a high school and business college education at Wilkes-Barre, entered the telephone field at the age of 18 as stenographer for the People's Telephone Co. of Wilkes-Barre.

Two years later, in 1901, he secured the position of assistant auditor with the Consolidated Telephone Cos. of Pennsylvania, and in 1905 was promoted to auditor. In 1910 he was made general auditor of the American Union Telephone System, with headquarters at Philadelphia.

Upon the organization of the Consolidated Telephone Co. to take over the extensive system operated by the receivers of the Consolidated Telephone Cos. of Pennsylvania in 1913, Mr. Prisk was made general manager. Under his guidance, the company has experienced a



E. M. Prisk.

rapid and healthy growth, new equipment has been installed in many of the exchanges and service brought up to a high standard of efficiency.

During its brief period of operation the company has established an organization which is able to conduct the business to the satisfaction of its patrons and also to the financial advantage of its security holders.

Mr. Prisk is president of the Eastern Pennsylvania Independent Telephone Association, and a member of the executive committee of the Eastern Traffic Association. He was a director of the old Independent Telephone Association of America prior to its merger into the present national association and he is now a member of the United States Independent Telephone Association.

His is a forceful, aggressive character and he is a very hard worker; in fact, the harder the task the better he likes it.

Fred R. Parrett, general manager and treasurer of the Princeton Telephone Co., of Princeton, Ind., is a Hoosier by birth. He received his early education at the public schools in Princeton and Purdue University, Lafayette, Ind.

Prior to his entry into the telephone business, Mr. Parrett was engaged in the drug business and he is still a registered pharmacist in Indiana. In 1898 he installed a switchboard at Patoka, Ind., and began operating with about 50 subscribers, using telephones equipped with Blake transmitters.

In 1902 he was transferred to the Evansville office of the Cumberland Telephone & Telegraph Co., where he remained for several years doing office work. He was then offered (in 1905) the position as manager of the Princeton Telephone Co., which position he still holds. Since that time he has had full charge of all construction and extension work of the Princeton Telephone Co. and the Oakland City Telephone Co.

Mr. Parrett has been most active in state and district association affairs, as member of the Indiana Independent Telephone Association, of which he is now a director, and as secretary of the Southern Indiana Independent Telephone Own-

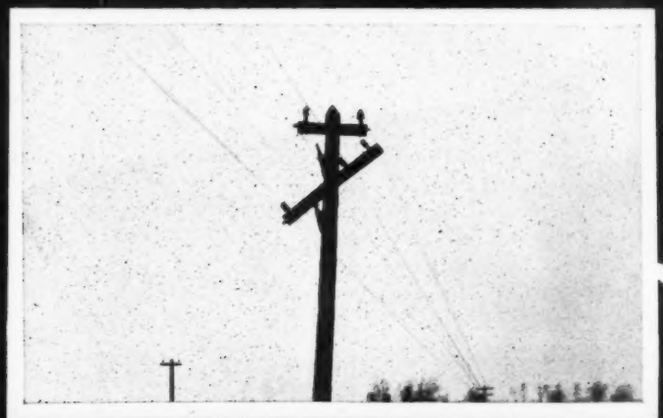
Fred R. Parrett.

ers' Association. He is also a member of the United States Independent Telephone Association.

He is a Knight Templar.

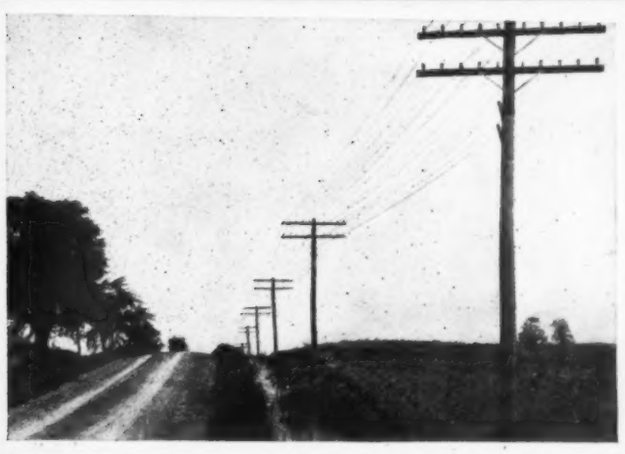
R. J. Horner, formerly solicitor for the Union Telephone Co. at New Castle,

Telephone Facts!



Pole Line Construction as it often is..

Rural Line Construction as it should be...



WE HELP MAKE LINES AS THEY SHOULD BE

FIRST: By keeping in stock, and available for prompt shipment, reliable line supplies, wire line and pole hardware, tools, poles, etc.

SECOND: By supplying copies of Secrets of Service, a complete guide to construction. The Kellogg Company are now distributing the third edition of this book, which is of great practical value to men who build, rebuild, and repair telephone lines. It contains photographs of actual construction, and explains simply how to build right for the best practical service.

Sent free on request to interested telephone men. Have you a copy of our line supply bulletin and separate price list? We will have a new, illustrated net price list from the press in a few days. Be sure you get your copy.

KELLOGG SWITCHBOARD & SUPPLY COMPANY

CHICAGO, ILL.

BRANCH OFFICES: KANSAS CITY, MO. SAN FRANCISCO, CAL.
Columbus, Ohio, 409 Huntington Bank Building

The Only Exclusive Telephone Supply House

Pa., has been promoted to the position of division manager at New Castle, succeeding F. R. Hillhouse.

J. H. Prior, formerly chief engineer of the Illinois Public Utilities Commission, has left the service of the Illinois commission to open an engineering office in Chicago.

J. N. Cadby, for the past ten years connected with the Wisconsin Railroad Commission, has resigned and will open an office as consulting engineer in Madison, Wis. Mr. Cadby for many years was in charge of the telephone service and his technical papers relating to the engineering industry have attracted considerable attention. The commission has not announced his successor.

H. L. Gary, of the Kansas City Home Telephone Co., was in Chicago last week on business and paid a welcome visit to TELEPHONY's office. He reports that the Kansas City Home is pushing ahead in a most gratifying mannare and that collections are unusually good.

Arthur F. Adams, vice-president of the Kansas City Home Telephone Co., is spending some of the heated term at Green Lake, Wis.

C. A. Gates, of Dallas, Texas, general manager of the Southwestern Telegraph & Telephone Co., has been promoted to the vice-presidency of the company. He has also been made consulting engineer for the Southwestern Bell Telephone Co., and will have headquarters in Dallas and St. Louis. Mr. Gates will serve in an equal capacity with J. E. Farnsworth, of Dallas, also vice-president of the company.

George E. Hall is the new general manager of the Southern Telephone Co. with headquaters at Evansville, Ind. Mr. Hall was formerly commercial superintendent of the Cumberland Telephone & Telegraph Co. at Louisville, Ky., and has been connected with the Bell company in the Middle West for about 25 years.

J. C. Duncan, president and treasurer of the People's Telephone & Telegraph Co., Knoxville, Tenn., is just getting back to real work after an operation for appendicitis.

Russell Hopley, formerly assistant commercial manager of the Iowa Telephone Co. at Fort Madison, Iowa, has been promoted to the managership of the company's exchange at Shenandoah, Iowa.

Harold G. Davis has been appointed manager of the Southern New England Telephone & Telegraph Co. at Waterbury, Conn. Mr. Davis, who has been with the company for six years, was formerly special commercial agent at Hartford.

Australia Continues Development

Government Places Order for New Automatic Telephone Exchange in Business District of Sidney—Displaces Manual Board in Residence Section of Melbourne—More Equipment for Additions to Other Automatic Offices

Recent advices received from Australia tell a most inspiring story of the continued telephone development in that country.

Despite the tremendous drain of men, money and material incident to the splendid part the commonwealth is taking in the war, the government, which owns and operates the telephone system in that country, is finding means and time to carry out, at least partially, the program of rehabilitation laid down some five years ago, and is seeking to keep the telephone facilities abreast of the most pressing needs.

Compared with American standards, the use of the telephone in Australia has been rather backward, but of late this has been rapidly changing, and the demands made upon the telephone service are becoming most severe. This, together with the very much depleted staff, which has responded gallantly to the call to military service, and the need of funds for other purposes, has presented a most perplexing problem to the post office officials and engineers.

But, despite this pressure, there has been no abandonment of the plans which were outlined after a most careful and exhaustive study of the telephone field and the trend of development in equipment and operating methods made in behalf of the government by John Hesketh, chief electrical engineer, and his associates during 1911 and 1912. As a result of these investigations, a course of construction was recommended which, based upon the general substitution of automatic equipment in all the major areas, would meet the requirements of the service for a period of at least 20 years.

Very considerable progress had been made in this direction, and some 12 or 15 automatically-operated offices had been installed, when the war intervened. Since that time there has, of course, been a slowing down of development although not an entire cessation and a policy of temporary expedients has been adopted wherever possible. The recent activity of the post office department indicates that the ultimate plan has not been abandoned, but simply deferred.

The most conspicuous example of this is found in the case of Sydney, where a new exchange, to be known as "City North," has been authorized and orders issued for its construction.

At present the major portion of Sydney's most important business section is served by a manual switchboard located in the main post office building, and known as the "City" exchange. The capacity of this board is now entirely occupied. To relieve the situation and handle the rapidly growing number of subscribers in this section, the City North office, planned for an ultimate capacity of 20,000 lines, is being established.

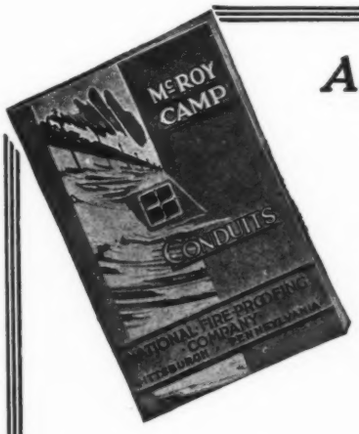
The immediate installation will consist of 2,800 lines of automatic central office equipment, so arranged that simply by adding individual line and trunking switches it can be brought up to 5,500 lines capacity. The City North exchange will be housed in a new building, designed especially for automatic operation in accordance with the most approved ideas. Space for 20,000 lines of equipment will be provided, and the extra space will be utilized by offices for the department staff until needed for telephone quipment.

The ultimate plan, which calls for the entire conversion of the Sydney metropolitan network to automatic operation, provides for a new "City South" exchange, located in the southern half of the business district and substantially similar in size and design with the City North office. It is proposed then to transfer the present city subscribers into the North or South City offices, and abandon the old exchange entirely.

Because of geographic conditions, the city being cut into numerous widely separated sections by arms of the bay, Sydney presents a very complex telephone problem, having no less than 31 offices. With the completion of the City North office, 12 of these will be operating automatically, the balance being partly magneto and partly common battery.

Of course, connections between all automatic subscribers will be handled mechanically, while calls between automatic and manual stations will require the services of an operator. To handle connections from manual subscribers to automatic numbers, two manual offices are equipped with special B boards, having trunks to all the automatic exchanges over which calls are set up direct by the B operators. A call from an automatic subscriber to a manual station is trunked to the proper manual exchange by the calling party's dialing designated digits. This connects to a B operator, who completes the connection manually.

This solution of a very complex con-



Announcing a New Hand Book

on Underground Electrical Installations with

McRoy-Camp Conduits

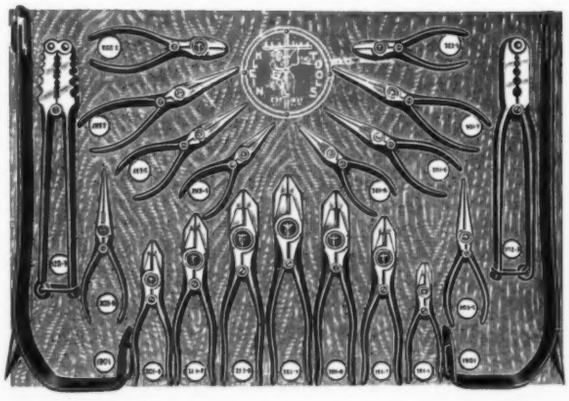
A complete treatise on cable and glazed Conduit Construction

May we send you a copy?

NATIONAL FIRE PROOFING COMPANY

PITTSBURGH NEW YORK CHICAGO BOSTON

What Name instinctively comes to mind when you think of Linemen's Tools?



Why—

KLEIN TOOLS

—of Course

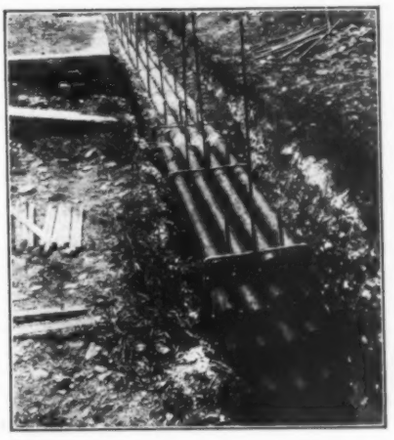
Leaders for 50 years! There are none better made. Indorsed the world over by enthusiastic users.

Write for Catalog No. 17.

Mathias Klein & Sons Canal Station 34 CHICAGO

Johns-Manville

FIBRE CONDUIT—



is not bulky—can be laid in shallow trenches

The cost of digging a shallow trench is of course much less than that of a deep trench. Johns-Manville FIBRE CONDUIT, not being bulky, can be laid in shallow trenches. Another thing—it's light. This means less freight, cartage and handling costs. Its light weight and lack of bulk save money at every step.

Its smooth bore and close-fitting, machine-cut joints make it exceedingly easy to "fish" when laid. And the insulation of the cable or wire can't be cut and torn when pulled in, because there are no rough seams, burrs or off-sets to rip and tear it.

Johns-Manville Fibre Conduit is watertight and gas-tight—has high insulating efficiency and is practically unbreakable. Write for facts or figures on Johns-Manville Fibre Conduit in electrical service.

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

Serves More People in More Ways Than Any Other Institution of Its Kind in the World

H. W. JOHNS-MANVILLE CO.
NEW YORK CITY
10 Factories - Branches in 55 Large Cities

dition has been in operation for some time, and has proved very successful and economical. The B operators, equipped with special impulse-sending devices, are able to set up calls at the rate of 700 per hour without any noticeable fatigue or sacrifice of accuracy. While, of course, the complete conversion of the Sydney area to automatic operation is expected to bring with it a decided improvement in service and a decrease in operating cost, the present situation is entirely practical and commercial.

Somewhat the same situation exists in the Melbourne area, where already one automatic exchange, the Brighton office, is in operation. In accordance with the government's plan of ultimate conversion, the very congested Malvern exchange is to be re-equipped at once, with an initial installation of 3,600 lines of automatic apparatus. This office will serve a residence area and, together with the Brighton section, which adjoins it, will cover a substantial portion of the southern section of the city.

In addition to the foregoing projects, orders have been placed for 1,000 lines of central office equipment, to be used as additions to various existing automatic exchanges, and also to care for the constantly increasing demand for private automatic exchange service. Already many of the largest commercial, industrial and public institutions have adopted this system for interior and city service and, with the rapid economic development of the country, this use is expected to grow to a very considerable extent.

From Factory and Salesroom

Miami Trailers Are Making Good in Different Services.

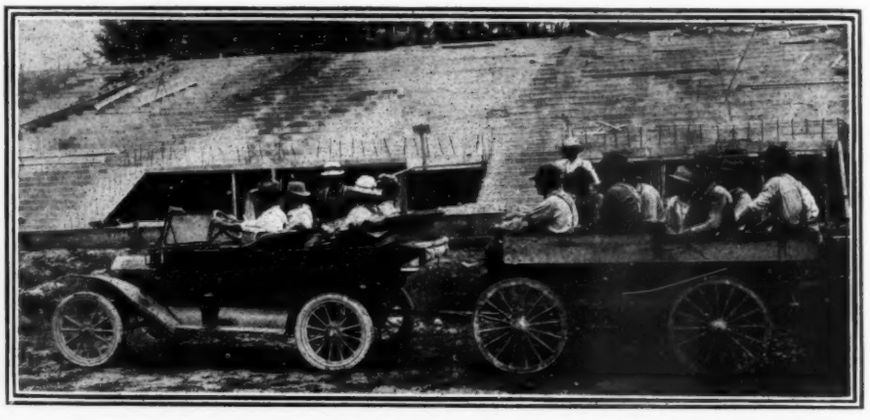
Miami auto trailers are now being used in a variety of work. One of the big advantages of the Miami trailer is that it can be hitched behind any automobile or motor truck. Coal companies, fire departments, express companies, taxicab companies, lumber companies, dry goods stores, and many other miscellaneous kinds of business, report excellent satisfaction from their Miami trailers.

The Adams & Thuma Lumber Co. of Jamestown, Ohio, purchased a model 12 Miami trailer some time ago, and has amply covered the initial investment by the extra haulage and convenience which have been obtained.

Hanneman Bros. of Detroit, Mich., have a Miami trailer, and advise that they save two 20-mile trips every day as a result of its use. The illustration shows clearly how easy it is to carry an extra nine or ten men. When labor is so expensive, this makes a Miami trailer a most desirable asset.

The Trojan Coal Co. of Trojan, Ohio, has not regretted its Miami trailer investment. For its work, which is heavy, and long hauls necessary in addition to the fact that deliveries must be prompt, the Miami trailer has proved invaluable.

But, possibly for no class of service has the Miami trailer given more satisfaction than in the telephone field. The Union Telephone Co. of Owosso, Mich., reports that it has been using a Miami trailer for several months, in connection with its lighter class of toll line work. For moving farm line poles, it has become very efficient and economical.



The Auto Trailer May Be Utilized to Carry Men as Well as Materials.

The Northwestern Telephone & Telegraph Co. of Carthage, N. Y., has strongly endorsed its one-ton Miami trailer, which it uses for hauling the line gang between the construction camp and designated work. This company states that with a gang of from 15 to 20 men its Miami trailer enables it to make a saving of from 25 to 50 cents per day per man, over and above what it would cost if a team were used for this class of work.

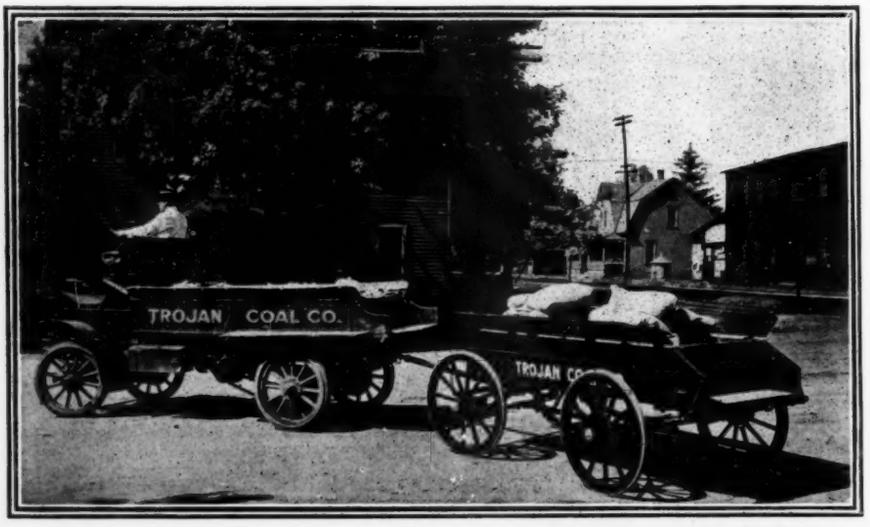
The Fredonia Telephone Co. of Fredonia, Kans., uses its Miami trailer for hauling poles, construction material, and men. Not only has it proved to be a time-saver, but it has eliminated the service of a teamster, which would cost $4 or $5 a day.

Other numerous and similar testimonial expressions are being received by the Miami Trailer Co. in praise of the Miami trailer, which would indicate that it is overwhelmingly making good in the telephone service.

The company has just issued a very attractive folder which features the different models of trailers now being manufactured.

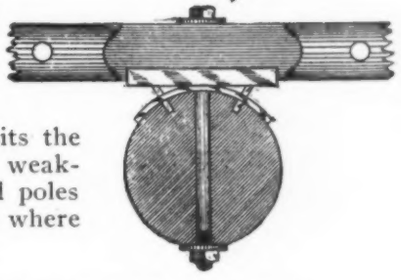
It is especially emphasized that in the equipment of Miami trailers nothing but first-class standardized materials are employed. For instance, other makes of axles and bearings might be employed, but "Timken" is specified for Miami trailers.

Excepting on model 1A, all of the other types of Miami trailers have solid



A Coal Company Finds That an Auto Trailer Is an Excellent Investment.

The HALLETT Steel Gain is the logical way to mount your cross arms on old or new poles----



The HALLETT STEEL GAIN prohibits the need of cutting holes in the gains, and weakening them. In fact, for certain sized poles and cross arms, no braces are required where HALLETT STEEL GAINS are used.

HALLETT STEEL GAINS make symmetrical and permanent construction. They speed up construction work, and give better satisfaction.

Now is the time to install HALLETT STEEL GAINS so as to have your lines prepared for a heavy fall and winter business.

Descriptive literature and prices on request. **All leading jobbers sell HALLETT STEEL GAINS**

THE HALLETT IRON WORKS HARVEY, ILLINOIS

Trouble Detectives!

PIGNOLET Portable Testing Meters will locate any kind of trouble besides measuring volts and amperes; will also determine resistance of coils, lines, ringers, etc.

VOLTMETERS
AMMETERS
VOLT-AMMETERS

Suppose you let us send you a copy of the PIGNOLET Catalogue. It's worth while.

L. M. PIGNOLET
30 Cortlandt Street New York
Medal Panama-Pacific International Exposition

ORANGEBURG FIBRE CONDUIT

Where "Out of Sight" is "Out of Mind"

When you bury your overhead wire troubles be sure that you're not sowing for a new crop. Wires put down *"out of sight"* in **ORANGEBURG Fibre Conduit** are *"out of mind."* Because **ORANGEBURG** quality insures protection that you can depend on.

Write for Book H

***The* FIBRE CONDUIT COMPANY**
ORANGEBURG, N. Y.
New York Boston Chicago San Francisco

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

rubber tires. The springs are oil-tempered, semi-elliptic.

The shock-absorbing draw-bar is one of the interesting features of the Miami trailer. This draw-bar is attached to the chassis of the machine, not to the axle. This is said to be a protection to the motor.

Automobile Truck and Trailer Are Money-Savers for a Lumber Company.

Miami trailers are made in either two-wheel or four-wheel styles, special bodies being furnished to suit the requirements, as may be demanded by specific hauling problems.

The Miami Trailer Co., which has its headquarters in Troy, Ohio, manufactures nothing, as its name implies, but automobile trailers for the trade.

W. F. Jolley, who is general manager of the company, and who has attended a number of telephone conventions, will be very glad to send the company's latest literature describing Miami trailers, to any or all telephone companies, upon request.

"Buy Your Motor Trucks Early" New Motto.

"Do your motor truck buying early."

That is the slogan which is now being heralded across the country for the reason that the government is looking about, with the idea of ordering some 70,000 trucks. This means that the farmer, the factory owner, the merchant of progressive tendencies and the telephone manager ought to get his order in now, to assure him of his vehicle. For when the U. S. A. wants things, it usually manages to get them.

Users of light trucks need not worry, however, with the "attachment" company on the job. Utilization of the pleasure car chassis permits the quick change from a touring car to a ton truck, as is the case with the Smith Form-a-Truck. This firm is not handicapped so long as the pleasure car makers continue to produce their machines, for an output of 40,000 this year is predicted by the productive manager of the Smith Motor Truck Corporation.

However, with Uncle Sam casting about to locate enough trucks to supply his tremendous army, chances are that many makes of trucks will be put into use, and that the man who needs a commercial power vehicle will do well to make his bid for it while he still has a chance of having his efforts result in obtaining the vehicle.

Kellogg Universal Switchboard at Park Falls, Wis.

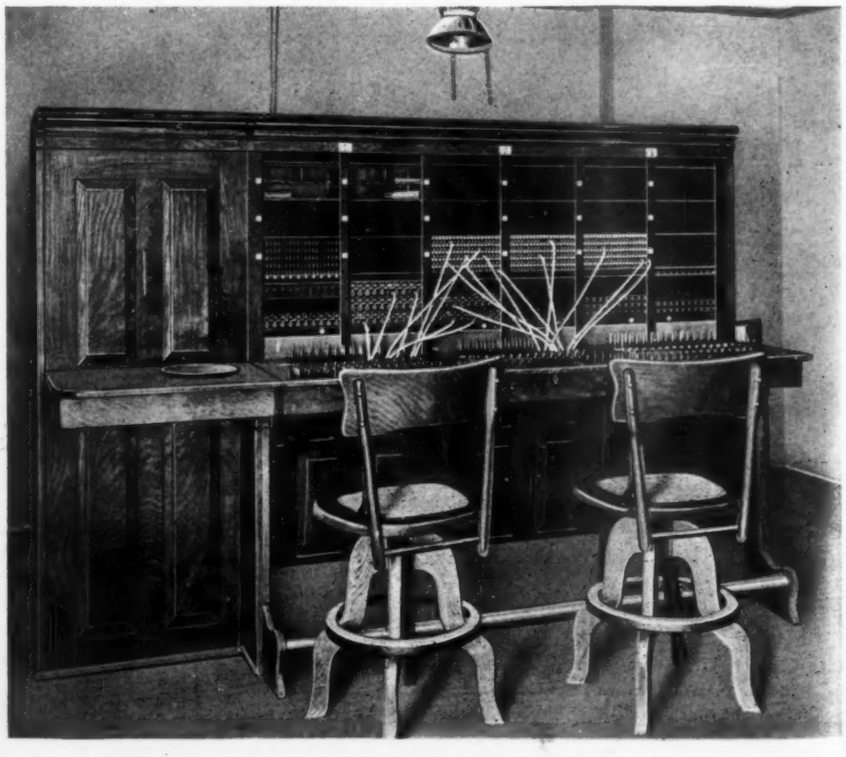
Installation of the new 1,200-line Kellogg universal switchboard is progressing at Park Falls, Wis.

The Glidden Telephone Co., after a comprehensive and careful investigation of switchboards, decided in favor of the Kellogg universal on grounds of efficiency and economy, and accordingly placed its order with the Kellogg company for a handsome three-position switchboard.

This board, with its universal cord circuits, combines the advantage of common battery with magneto service. Subscribers can be changed from magneto to common battery telephones one at a time, or as desired.

This is a lamp signal board possessing all of the advantages of the Kellogg standard magneto cabinets with the ease and facility of operation, as well as economy and long life, of the Kellogg standard common battery sections.

The illustration shows a board very similar to that which is being installed in Park Falls.



Type of Kellogg Universal Switchboard Which Is Being Installed in Park Falls, Wis.

Paragraphs.

W. N. Matthews & Brother announce the removal of their Chicago office from 507 S. Clinton street, where it has been located for 16 years, to Room 400, the Lees Building, 19 S. Fifth avenue, Chicago.

Crouse-Hinds Co., Syracuse, N. Y., has just issued Bulletin No. 303, "Imperial Flood Projectors and Imperial Reflectors," in which is listed and described the various types of flood light projectors and reflectors developed to date. In addition, the established Crouse-Hinds line, 1,000-watt projectors in types for both marine and land use are listed. Illumination and lamp statistics are presented which are of value to anyone interested in flood light questions. Copies of the bulletin will be mailed free upon request.